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GROUNDWATER PROTECTION MAPPING FOR
MCHENRY COUNTY, ILLINOIS:
DRILLING REPORT

-by-


B. Brandon Curry

with assistance from Richard C. Berg, Michael L. Barnhardt,
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Illinois State Geological Survey
Champaign, Illinois

Open File Series 1995-1

Contract Report to:
McHenry County Board of Health
Maichle Bacon, Director
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Abstract

The McHenry County Board of Health, the Illinois State Geological Survey (ISGS) and the Illinois State Water Survey (ISWS) have determined that McHenry County is in need of geologic mapping for the purpose of assessing the potential of groundwater contamination of the County. This report provides logs (diagrams) of the lithology, stratigraphy, and interpreted environment of deposition of Quaternary deposits from 54 significant borings in McHenry County. In addition, the report presents statistical summaries of the data that characterize the grain size and the mineral content of the $<2\mu\text{m}$ fraction of the stratigraphic units. Twelve borings were drilled and sampled as part of a project to provide geologic maps and groundwater protection maps for McHenry County.

Introduction

At the request of the McHenry County Board of Health, and as part of a state-wide effort to assess groundwater sensitivity, the Illinois State Geological Survey (ISGS) and Illinois State Water Survey (ISWS) initiated a geologic mapping program for a groundwater protection project in McHenry County. Presently McHenry County is the fastest growing county in Illinois. The complex Quaternary glacial and post-glacial deposits in McHenry County have long been noted for their abundance of sand and gravel (Anderson and Block, 1962; Hackett and McComas, 1969; Specht and Westerman, 1976; Masters, 1978; Berg et al., 1985; Berg, 1994). Geologic mapping for groundwater protection was initiated in McHenry County to (1) establish a geologic framework, (2) delimit the thickness and distribution of aquifers and non-aquifer units (aquitards) and (3), rank the sensitivity of aquifers to near-surface contamination. Essential to ranking aquifers is the determination of the porosity and permeability of the materials comprising them and the measurement of piezometric heads within them. The geologic framework and mapping of aquifers and aquitards provides a basis for making decisions regarding environmental planning such as establishment of set-back zones for municipal or household wells, and regulated recharge areas for local ordinance development.

To provide the county with the most accurate maps possible, the ISGS and ISWS have examined the existing database of (1) water well logs, (2) bridge foundation boring logs, (3) logs of borings for characterization of proposed landfills, and (4) stratigraphic test borings done previously by the ISGS. The review of the data included verification of the location of water wells specified on driller's logs on file at the ISGS. An important series of 11 borings done in McHenry County prior to this study is given the prefix "NIPC" (for the Northeastern Illinois Planning Commission; Lund, 1965) and was used during an earlier mapping effort by the ISGS (Specht and Westerman, 1976). Moisture content, unconfined compressive strength, blow counts and visual descriptions for the NIPC borings are reported in Lund (1965). Lithologic logs from the 11 NIPC borings are included in this report (table 1; figs. 1, 15-25).

After review of the existing well data, sites for additional test-borings were selected and drilled by the ISGS to collect samples. A total of twelve borings, part of the MC series, were sampled between 9/14/92 and 12/1/92 (table 1; figs. 1, 3-14). These borings, including five shallow borings (< 65 ft deep) and seven deep borings (from 111.5 to 321.0 ft deep), were sampled, described, and subsampled for laboratory analyses. The analyses included 272 determinations of particle-size and 209 analyses of clay mineralogy. Downhole neutron and gamma ray logs were conducted for all of the MC and earlier NIPC borings.

Particle-size distribution and clay mineral data from the MC and NIPC borings were used to characterize the lithology and mineralogy of the stratigraphic units. Downhole gamma ray and neutron logs were used in some cases to help determine the elevation of lithologic contacts; the logs are available for inspection and copying in the Geologic Records and Samples Library at the ISGS.

Cross sections and stick logs of 31 borings from 6 landfill siting reports in McHenry County also have been included in this compilation (table 1, figs. 26-33), but extensive laboratory results are not included. Numerous particle-size and clay mineral analyses done earlier by the ISGS were available for the borings from the proposed landfill near the intersection of Routes 47 and 176 in Sections 28 and 29 of the Dorr Township (T. 44 N, R. 7 E.); these laboratory data aided in the stratigraphic and sedimentological interpretation. The lithostratigraphy from the five other sites is based on less diagnostic laboratory data such as moisture content, blow counts, Atterberg limits, visual descriptions but including a limited number of particle-size distribution and clay mineral analyses. References for data from the proposed landfill studies include Jennings (1985) for the Pyott Road site, Professional Service Industries (1989) for the Hartland site, Cartwright et al. (1975) for the Route 47/176 site, Patrick Engineering (1986) for the McCue Road site,

Hydropoll (1992) for the Veugler (Lake In The Hills) site, and Hughes et al. (1971) for the proposed Davis Road site.

Methods

Borings. In areas where relatively shallow data were needed, a Central Mining Equipment (CME) continuous sampler was used with the ISGS's Mobile B-30s drill rig. Cores obtained by this method had a diameter of about 2.3 inches. Standard drilling with circulating mud was used for borings MC-4 and MC-5.

Seven borings were sampled from ground surface to bedrock using a CME 75 drill rig under contract to the County. The upper part of the boring was sampled with a CME continuous sampler; the lower part of the boring was drilled with standard rotary techniques using circulating mud and sampled using 2 inch by 24 inch split-spoons. The latter method yielded cores no more than 2 ft long with a diameter of about 1.7 inches; sampling was done at 5 or 10 foot intervals.

Visual Description. Cores were described in the field, wrapped in cellophane, and stored in core boxes. Sediment descriptions included the color of moist samples (Munsell, 1988), sedimentary structures (bedding), leaching of carbonate minerals, and the nature of lithologic contacts (abrupt, gradational, etc.; ISGS, 1989). Cores were subsampled for analyses of particle-size distribution and clay-mineral content.

Particle-size distribution. Grains with diameters $> 53 \mu\text{m}$ were analyzed by wet sieving, and grains with diameters $< 53 \mu\text{m}$, by a SediGraph 5000 ET[®]. The SediGraph[®] was used in this study because it is a relatively rapid method that determines fine and medium silt content. In addition, other studies have shown that the SediGraph[®] yields results that are similar to the hydrometer method (Coakley and Syvitski, 1991), which was the method used in previous studies by the ISGS in McHenry County (Wickham et al., 1988). The SediGraph[®] method, described in Micromeritics (1984), was as follows:

- (1) An oven-dried subsample was gently crushed with a ceramic mortar and pestle and weighed.
- (2) Organic material was removed by soaking the subsample in hot bleach for 15 minutes. The disaggregated subsample was rinsed, placed in a 5% solution of sodium metaphosphate buffered with sodium bicarbonate, and agitated for at least 12 hours.
- (3) The dispersed subsample was washed through a sieve with $53\mu\text{m}$ openings. The retained sediment was dried and passed through a nest of sieves with screen opening diameters of 4 mm, 2 mm and 0.063 mm. The fractions representing gravel ($>2 \text{ mm}$) and sand ($63 - 2000 \mu\text{m}$) were determined from these data. The $53 - 63 \mu\text{m}$ fraction was added to the 32

- 53 μm fraction determined with the SediGraph® to derive the coarse silt fraction (32 - 63 μm).

- (4) The clay (< 4 μm), fine silt (4 - 16 μm), medium silt (16 - 32 μm) and 32 - 53 μm fraction was analyzed by a model 5000 ET SediGraph®. Precision of the SediGraph® was assured by the testing of standards supplied by Micromeretics and from internal standards.

Clay mineral content of the <2 μm fraction. Several

lithostratigraphic units in the McHenry County area possess a unique clay mineral composition as well as a unique particle-size distribution (Table 2) (Willman et al., 1963; Berg et al., 1985; Wickham et al., 1988). This study used X-ray diffractograms of oriented, ethylene glycol-solvated subsamples of the \approx 2 μm fraction of cores (ISGS, 1989). The classes of clay minerals quantified by the procedure include (1) clay minerals with basal d-spacings that expand to \approx 17Å when glycolated (chiefly low-charged vermiculite and smectite), (2) illite (d-spacing = 10Å), and (3) kaolinite plus chlorite (d-spacing = 7.2Å). Calcite and dolomite are measured in terms of counts-per-second (ISGS, 1989). The diffraction intensity ratio (DI) measures the ratio of the intensity of the 10Å illite peak to the 7.2Å kaolinite-chlorite peak on a logarithmic plot. The vermiculite index (VI) is a linear measurement of the relative height of the vermiculite peak at \approx 14Å and illite at 10Å. The heterogeneous swelling index (HSI)

is a linear measurement of the {001} reflection and the saddle of lower intensity at lower 2θ positions on a logarithmic plot (Wickham et al., 1988; ISGS, 1989). In northern Illinois, all of these ratios (DI, VI, HSI) of glacial diamictites (tills) generally become larger upon weathering (Willman et al., 1966). The VI and HSI of loessial sediment in this area are also high (Curry, 1989).

Stratigraphic framework

The stratigraphic nomenclature of Willman and Frye (1970) is followed in this report, although this nomenclature will be changed by forthcoming publications (Hansel and Johnson, in press). The regional characteristics of the lithostratigraphic units of the Wedron Formation are discussed in Wickham et al. (1988); units belonging to the Glasford Formation have been correlated to units described in Boone and Winnebago Counties (Berg et al., 1985).

Bedrock units and bedrock topography

The lithology and hydrological characteristics of bedrock lithostratigraphic units that underlie McHenry County, including the Ordovician Maquoketa Group and Silurian carbonate rocks, are discussed in Graese et al. (1988), Graese (1991) and Visocky et al. (1985). The type sections for these rocks are in the Chicago region. In adjacent Kane County, the stratigraphic sequence is

more complicated (Graese, 1991). The complex facies relationships probably extend northward to McHenry County, but there are only a few cores available for study and no bedrock outcrops. Short cores of the uppermost bedrock were sampled in this study; stratigraphic determinations shown in the lithologic logs were made by the author and are preliminary.

The bedrock topography of McHenry County is being mapped for this study, and will be presented in the final contract report. An important feature in the northwestern corner of McHenry County is the northeast-southwest trending thalweg of the Troy Bedrock Valley (Wickham et al., 1988). Bedrock valleys are important because they commonly contain significant sand and gravel aquifers, such as the St. Charles aquifer in Kane County (Curry and Seaber, 1990). There are no other significant bedrock valleys in McHenry County.

Quaternary deposits

Quaternary deposits, primarily consisting of glacial drift, are as much as 475 feet thick in the Troy Bedrock Valley in northwestern McHenry County. Drift less than 10 ft thick occurs in the southwestern part of the county (Hackett and McComas, 1969).

The stratigraphic sequence of Quaternary deposits in McHenry County (fig. 2) includes a series of glacial deposits (till,

outwash, glaciolacustrine sediments) separated by a thin deposit of non-glacial deposits (such as peat, or lacustrine sediment). Paleosols (weathering horizons) occur in sediments typically deposited during glacial periods (i.e., Curry, 1989). Detailed descriptions of the lithostratigraphic units will be provided in the final contract report from the ISGS to the McHenry County Board of Health.

The physical characteristics of the Quaternary lithostratigraphic units (fig. 2) are based on laboratory data from the MC and NIPC borings. Visual descriptions of the MC borings are included in Appendix A, and the laboratory data from both the MC and NIPC borings are presented in Appendix B. Each sample was assigned to a lithostratigraphic unit on the basis of (a) stratigraphic succession, (b) physical characteristics and (c) environment of deposition. Most samples analyzed belong to the Tiskilwa Till Member of the Wedron Formation and the Oregon Till Member of the Glasford Formation.

In several areas in McHenry County, a basal facies in the lower parts of till units is interpreted as resulting from incorporation and mixing of local deposits (generally older till) with younger englacial debris. In some cases, deformed layers and masses of underlying units can be recognized within a basal facies of the till unit, whereas in other cases, the basal till is uniform. A distinct mixed basal facies is most characteristic

of the Yorkville Till Member (fig. 31) and, less frequently, of the Haegar Till Member (fig. 28) and is noted on some cross sections. The relatively high standard deviations of data from the Glasford till units suggest that basal incorporation and incomplete mixing were widespread phenomena in the older glacial events as well, but are more difficult to establish due to the lack of closely spaced borings.

Summary

The data presented in this report provide a foundation for interpreting the lithostratigraphic framework of McHenry County. The presence of borings with detailed lithostratigraphic descriptions throughout the county facilitate stratigraphic and sedimentological interpretation of numerous additional water well and engineering logs. These data in turn are the basis for the cross sections and the geologic and groundwater protection maps that are evolving from our study of McHenry County.

Acknowledgments

The author would like to extend thanks to the ISGS staff members who helped collect and describe cores for this report including Michael L. Barnhardt, Richard C. Berg, William S. Dey, David R. Larson, Sam V. Panno, and Robert C. Vaiden. I also acknowledge the previous work of several former and current ISGS geologists who compiled data, described cores, and ran laboratory analyses of samples from the proposed Davis landfill, and the Route 47/176

landfill, including Sue Specht Wickham, John P. Kempton, Robert H. Gilkeson and Herbert D. Glass. Wickham and Kempton initially compiled the data from the NIPC borings and Route 47/176 landfill borings. Glass determined the clay mineral content of the NIPC borings and Route 47/176 borings, whereas the author determined the clay mineral content of the MC borings. Dey determined the particle-size distribution analyses of the MC borings. Ardith K. Hansel, E. Donald McKay, Myrna M. Killey and Leon R. Follmer helped develop the format used in the lithologic logs. Michael L. Barnhardt, Robert C. Vaiden, Ardith K. Hansel, Randall E. Hughes and Janis D. Treworgy reviewed the manuscript.

References

- Anderson, R. C. and D. A. Block, 1962, Sand and gravel resources of McHenry County, Illinois: Illinois State Geological Survey Circular 336, 15 p.
- Berg, R. C., 1994, Geologic aspects of a groundwater protection needs assessment for Woodstock, Illinois: a case study: Illinois State Geological Survey, Environmental Geology 146, 27 p.
- Berg, R. C., J. P. Kempton, L. R. Follmer, and D. R. McKenna, 1985, Illinoian and Wisconsinan stratigraphy and environments in northern Illinois: The Altonian revised: Illinois State Geological Survey Guidebook 19, 177 p.
- Cartwright, K., R. H. Gilkeson and J. P. Kempton, 1975, Geology of the McHenry County Landfill site, Routes 47 and 176, south of Woodstock, Illinois, unpublished letter with figures, Illinois State Geological Survey, Champaign, open file,
- Coakley, J. P. and J. P. M. Styvitski, 1991, SediGraph technique, in, J. P. M. Styvitski (ed.) Principles, methods, and application of particle-size analysis: Cambridge University Press, New York, pp. 129-142.
- Curry, B. B., 1989, Absence of Altonian glaciation in Illinois: Quaternary Research, v. 31, pp. 1-13.
- Curry, B. B. and P. R. Seaber, 1990, Hydrogeology of shallow groundwater resources, Kane County, Illinois: Illinois State Geological Survey Contract Report 1990-1, 37 p.
- Graese, A. M., 1991, Facies analysis of the Ordovician Maquoketa Group and adjacent strata in Kane County, northeastern Illinois: Illinois State Geological Survey Circular 547, 36 p.
- Graese, A. M., R. A. Bauer, B. B. Curry, R. C. Vaiden, W. G. Dixon Jr., and J. P. Kempton, 1988, Geological-Geotechnical studies for siting the Superconducting Super Collider in Illinois: Illinois State Geological Survey Environmental Geology Notes 123, 100 p.
- Hackett, J. E. and M. R. McComas, 1969, Geology for planning in McHenry County: Illinois State Geological Survey Circular 438, 31 p.
- Hansel, A. K. and W. H. Johnson, in review, Wedron and Mason Groups: a lithostratigraphic reclassification of deposits of the Wisconsin Episode, Lake Michigan Lobe area: Illinois State Geological Survey Bulletin.
- Hughes, G. M., R. A. Landon and R. N. Farvolden, 1971, Summary of findings on solid waste disposal sites in northeastern Illinois: Illinois State Geological Survey Environmental Geology Notes 45, 25 p.
- Hydropoll, Inc., 1992, Detection groundwater monitoring program at the Lake In The Hills material recovery facility (LHMRF) prepared for the village of Lake In The Hills.
- Illinois State Geological Survey, 1989, Technical procedures of

the Illinois State Geological Survey; Open file report submitted to Battelle Memorial Institute, Springfield, Illinois.

- Jennings, R. L., 1985, Report of Hydrogeological Investigations, Proposed Pyott Road Sanitary Landfill, submitted to Laidlaw Waste Systems, Inc., Hinsdale, Illinois
- Lineback, J. A. (compiler), 1979, Quaternary deposits of Illinois: Illinois State Geological Survey Map, scale 1:500,000.
- Lund, C. R., 1965, Data from controlled drilling program in McHenry County, Illinois: Illinois State Geological Survey Environmental Geology Notes 7, 64 p.
- Masters, J. M., 1978, Sand and gravel and peat resources in northeastern Illinois: Illinois State Geological Survey Circular 503, 11 p.
- Micromeritics, 1984, Instruction manual for the SediGraph 5000 ET Particle-size analyzer, Norcross, Georgia, 15 p.
- Munsell, 1988, Munsell Soil Color Charts, Kollmorgen Instruments Corp., Baltimore, MA.
- Patrick Engineering, Inc., 1986, Site Geology and basis for design of the proposed McHenry County landfill prepared for Waste Management of Illinois, Inc., Palos Heights, Illinois.
- Professional Service Industries, Inc., 1989, Soils exploration and foundation recommendations for the proposed McHenry County, Illinois, landfill, prepared for Graef, Anhalt, Schloemer and Associates, Milwaukee, WI.
- Specht, S. A. and A. A. Westerman, 1976, Geology for Planning in Northeastern Illinois. III. Geology for Planning in McHenry County, Open File Series, 1976-3, Illinois State Geological Survey.
- Visocky, A. P., M. G. Sherill and K. Cartwright, 1985, Geology, hydrogeology, and water quality of the Cambrian and Ordovician systems in northern Illinois: Illinois State Geological Survey and Illinois State Water Survey, Champaign, Cooperative Groundwater Report 10, 136 p.
- Wickham, S. S., W. H. Johnson, and H. D. Glass, 1988, Regional geology of the Tiskilwa Till Member, Wedron Formation, northeastern Illinois: Illinois State Geological Survey Circular 543, 35 p.
- Willman, H. B., H. D. Glass and J. C. Frye, 1963, Mineralogy of glacial tills and their weathering profiles in Illinois, Part I: Glacial tills: Illinois State Geological Survey Circular 347, 55 p.
- Willman, H. B., H. D. Glass and J. C. Frye, 1966, Mineralogy of glacial tills and their weathering profiles in Illinois, Part II: Weathering profiles: Illinois State Geological Survey Circular 400, 76 p.
- Willman, H. B. and J. C. Frye, 1970, Pleistocene stratigraphy of Illinois: Illinois State Geological Survey Bulletin 94, 204 p.

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- A Description of MC series borings.
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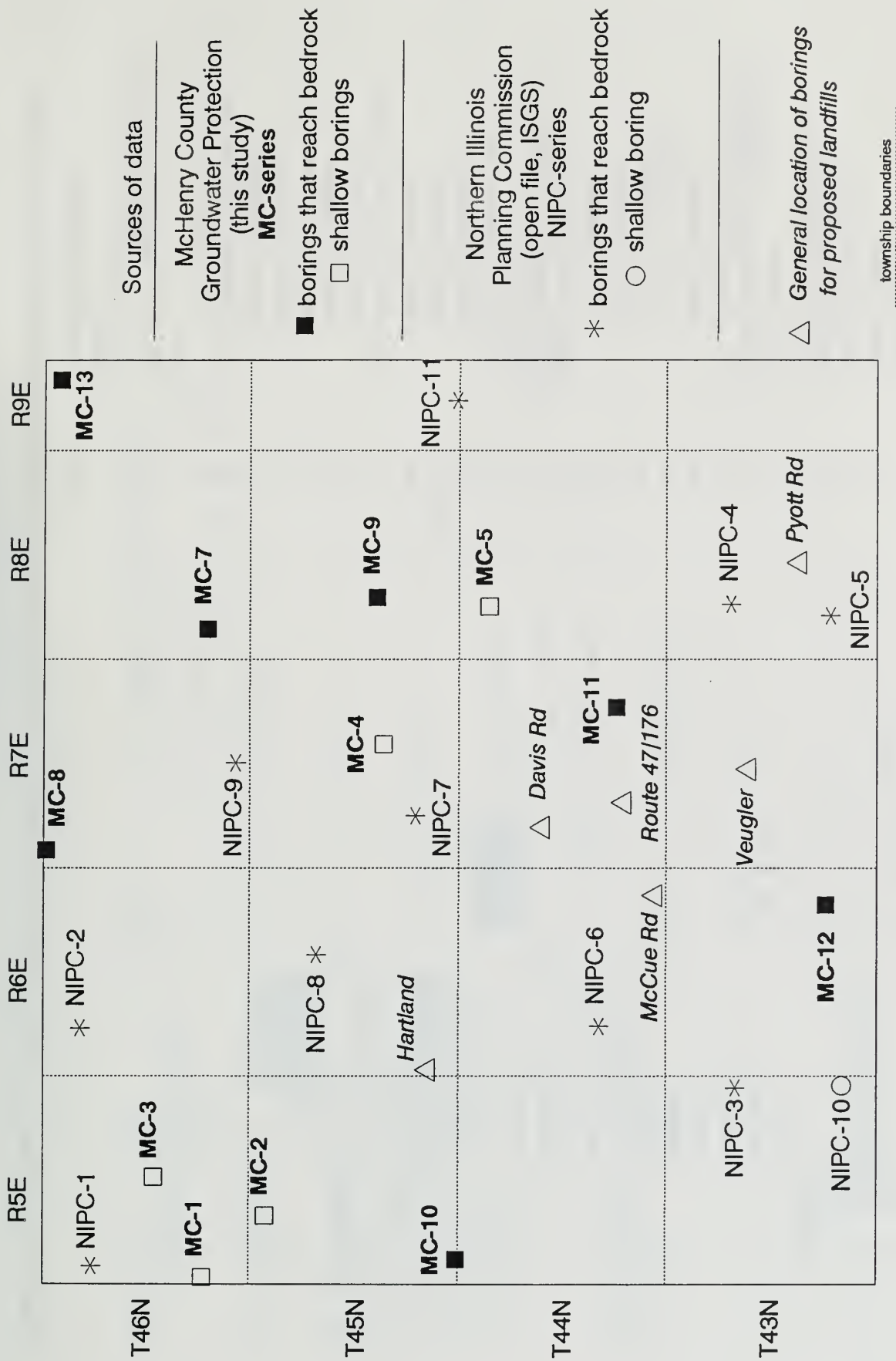


Figure 1 Boring locations in McHenry County, Illinois.

Lithofacies	(drift)	Materials	Lithostratigraphic Units
D	diamicton		Quaternary
S	sand		Grayslake Peat
G	gravel		Cahokia Alluvium
F	fine-grained sorted sediment		Peyton Colluvium
P	peat		Peoria Silt, Richland Silt
modifiers			Equality Fm, Carmi Member
-m	massive		Equality Fm, Dolton Member
-w	well sorted		Henry Formation
-p	poorly sorted		Wedron Formation, undifferentiated
-g	graded		Wadsworth Till Member
-s	stratified		Haegar Till Member
-l	laminated		unnamed till member
-r	rhythmic bedding		Yorkville Till Member
-C	convolutional bedding		Tiskilwa Till Member
-O	organic		Ashmore Member
-f	fossiliferous		Robein Silt, Berry Clay Member
-X	weathered		Pearl Formation
-xl	leached		Teneriffe Silt
-xo	oxidized		Winnebago Formation, undiff.
-xg	gleyed		Capron Till Member
-xht	B-horizon		Argyle Till Member
Lithofacies (bedrock)			Nimtz Till Member
RD	dolomite		Glasford Formation, undifferentiated
RS	shale		Belvidere Till Member
modifiers			Oregon Till Member
-fr	fractured		Oregon Till Member, silty facies
-x	weathered		Fairdale Till Member
-c	cherty		Kellerville Till Member
-sh	shaly		Banner Formation, undifferentiated
			Lierle Clay Member
			Silurian
			Elwood Formation
			Kankakee Formation
			Ordovician
			Maquoketa Shale Group

Figure 2 Key to lithofacies, materials, contacts and lithostratigraphic units of Quaternary deposits and shallow bedrock in McHenry County.

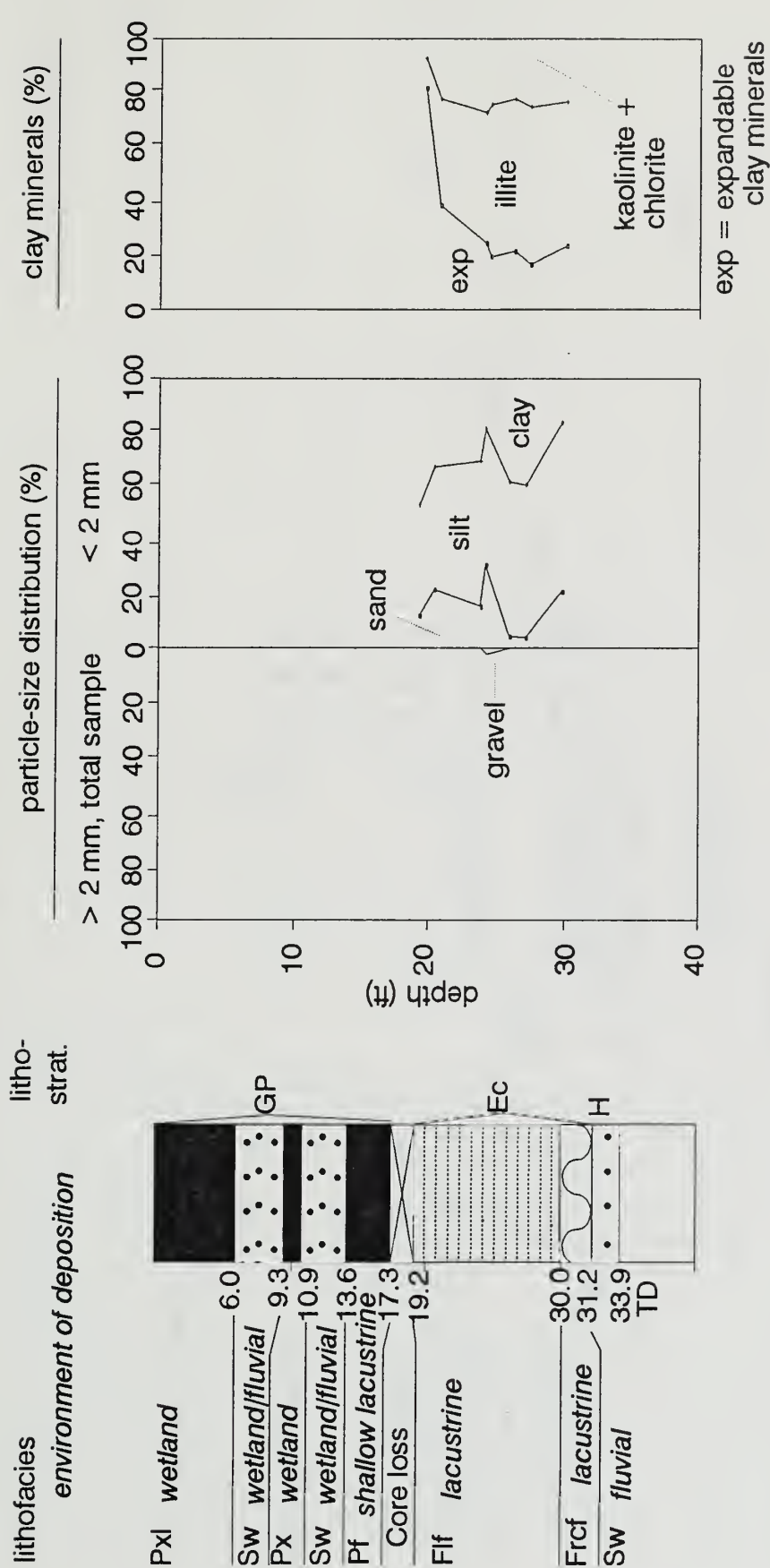


Figure 3 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring MC-1 (elev. 893 ft., Capron 7 1/2' quad).

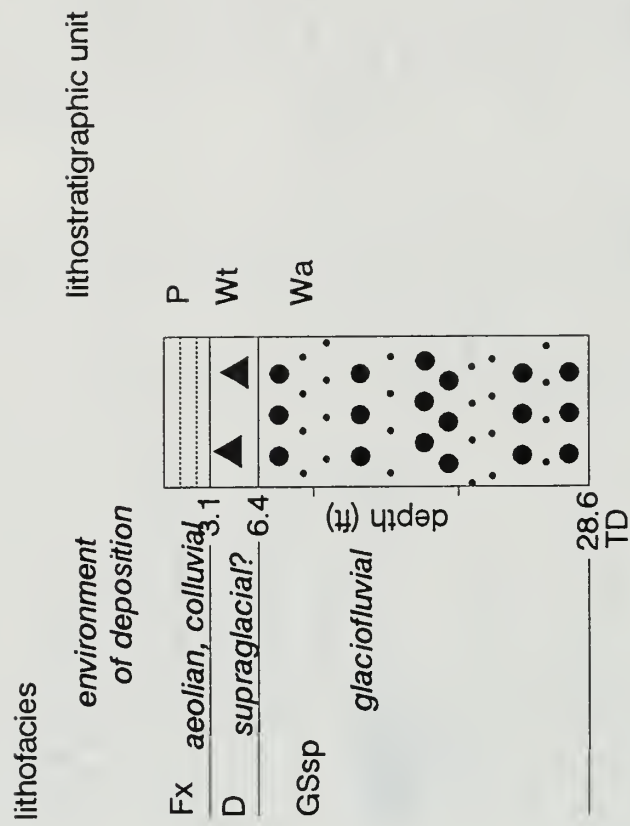


Figure 4 Lithofacies log and lithostratigraphic units for boring MC-2 (elev. 895 ft., Capron 7 1/2' quad).

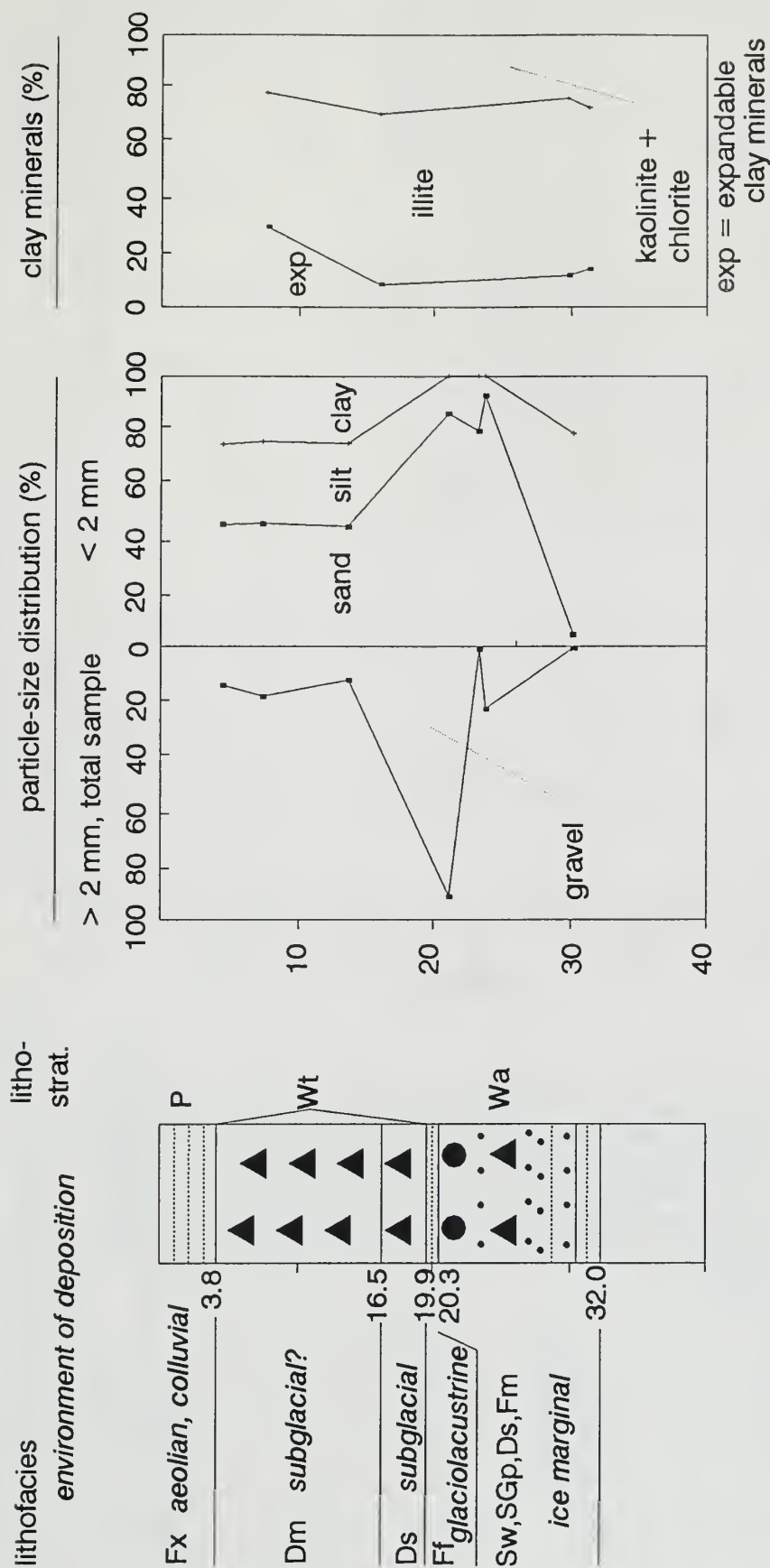


Figure 5 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring MC-3 (elev. 907 ft., Capron 7 1/2' quad).

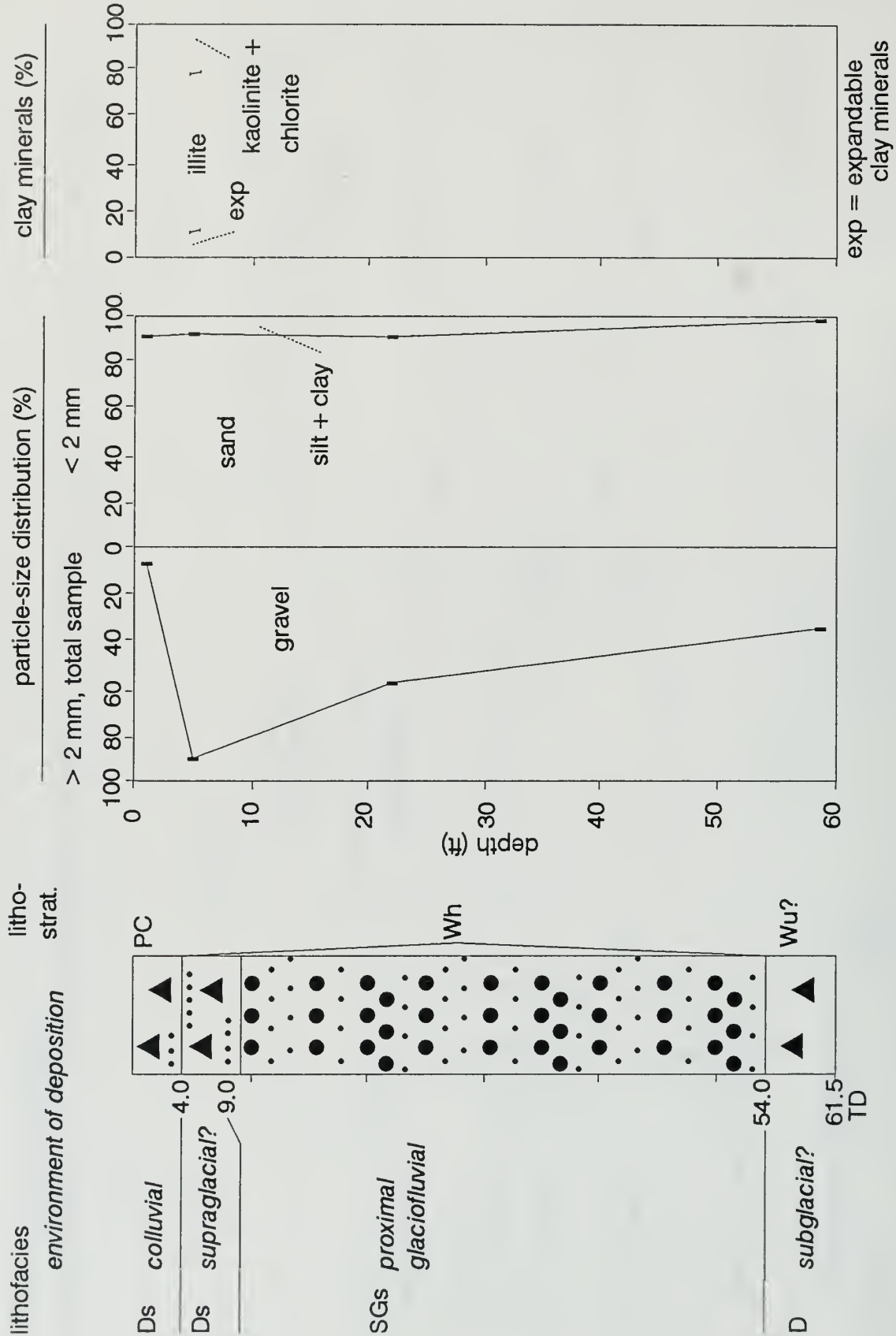


Figure 6 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring MC-4 (elev. 910 ft., Woodstock 7 1/2' quad).

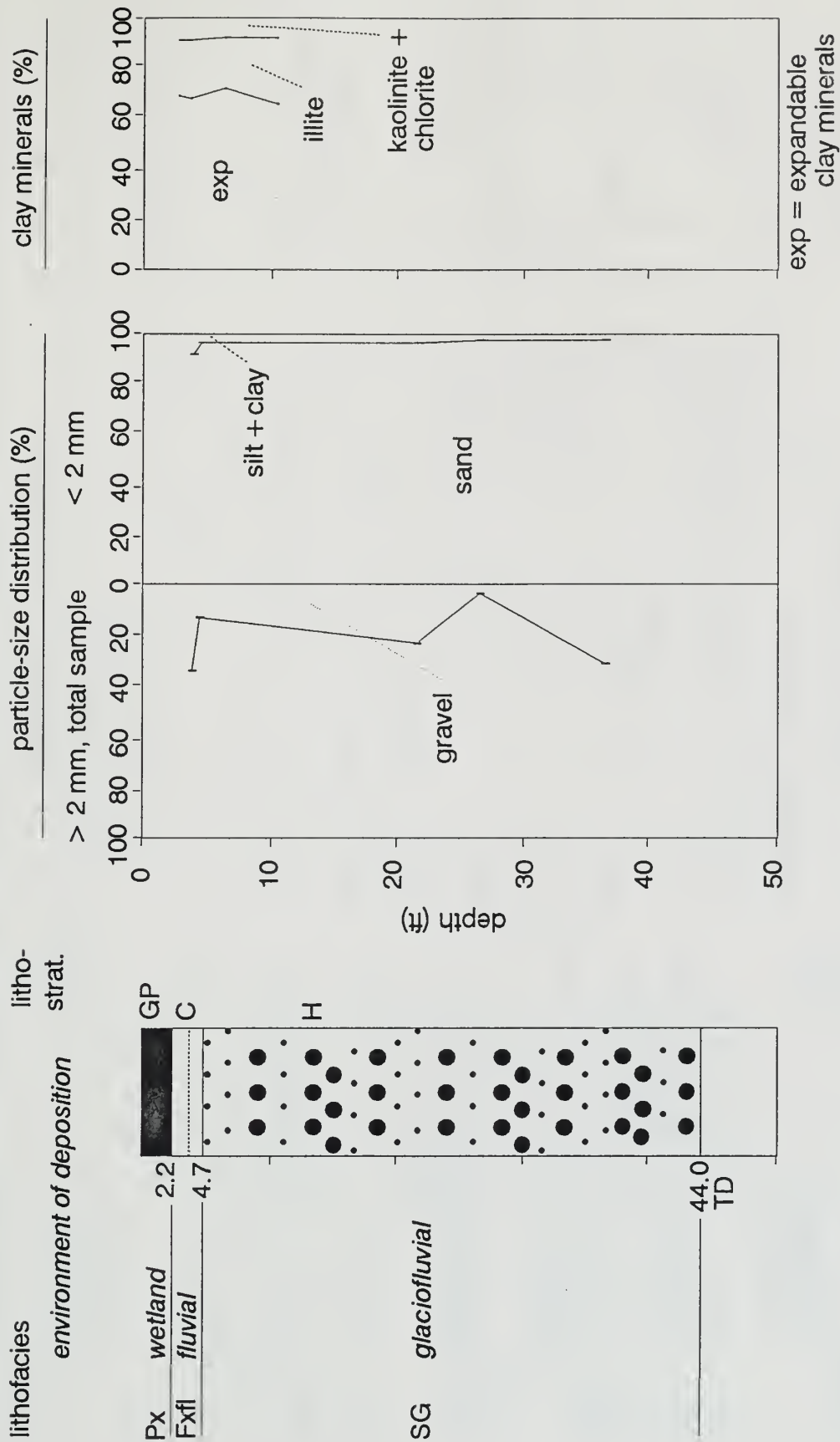


Figure 7 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring MC-5 (elev. 788 ft., McHenry 7 1/2' quad).

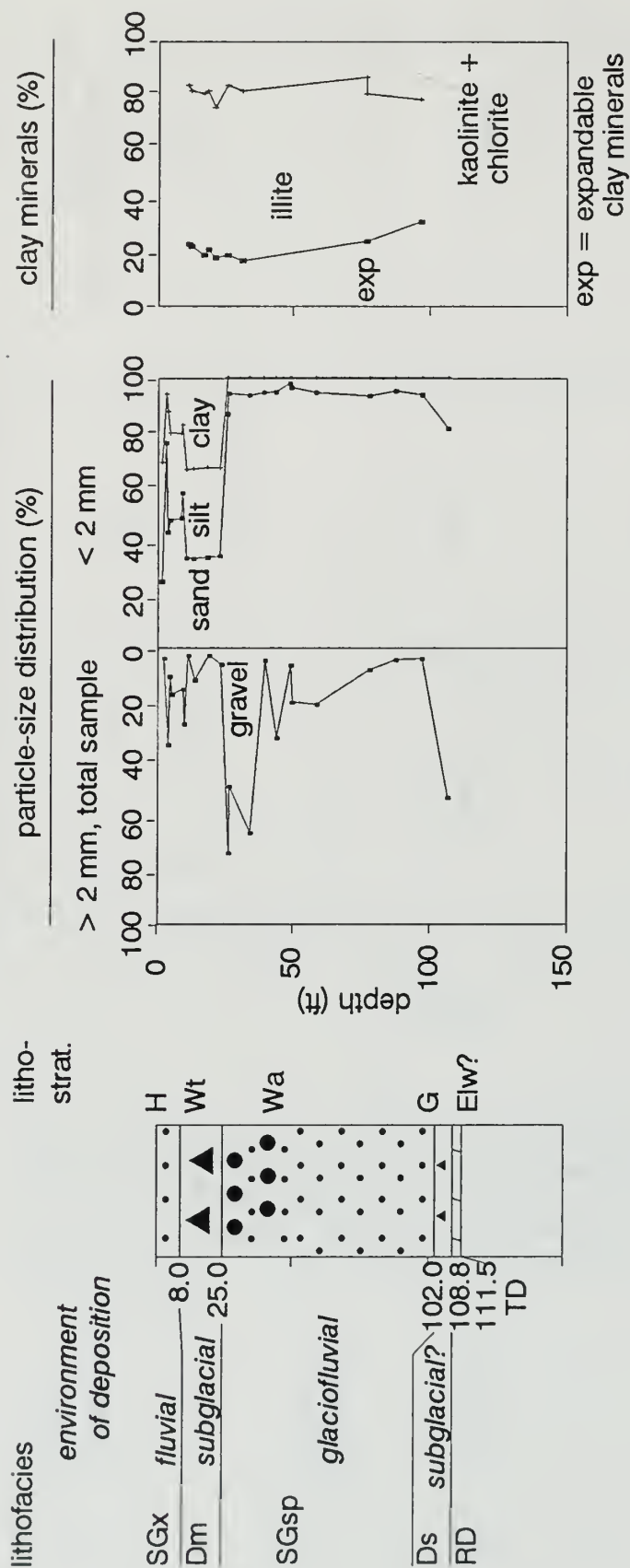


Figure 8 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring MC-7 (elev. 795 ft., Richmond 7 1/2' quad).

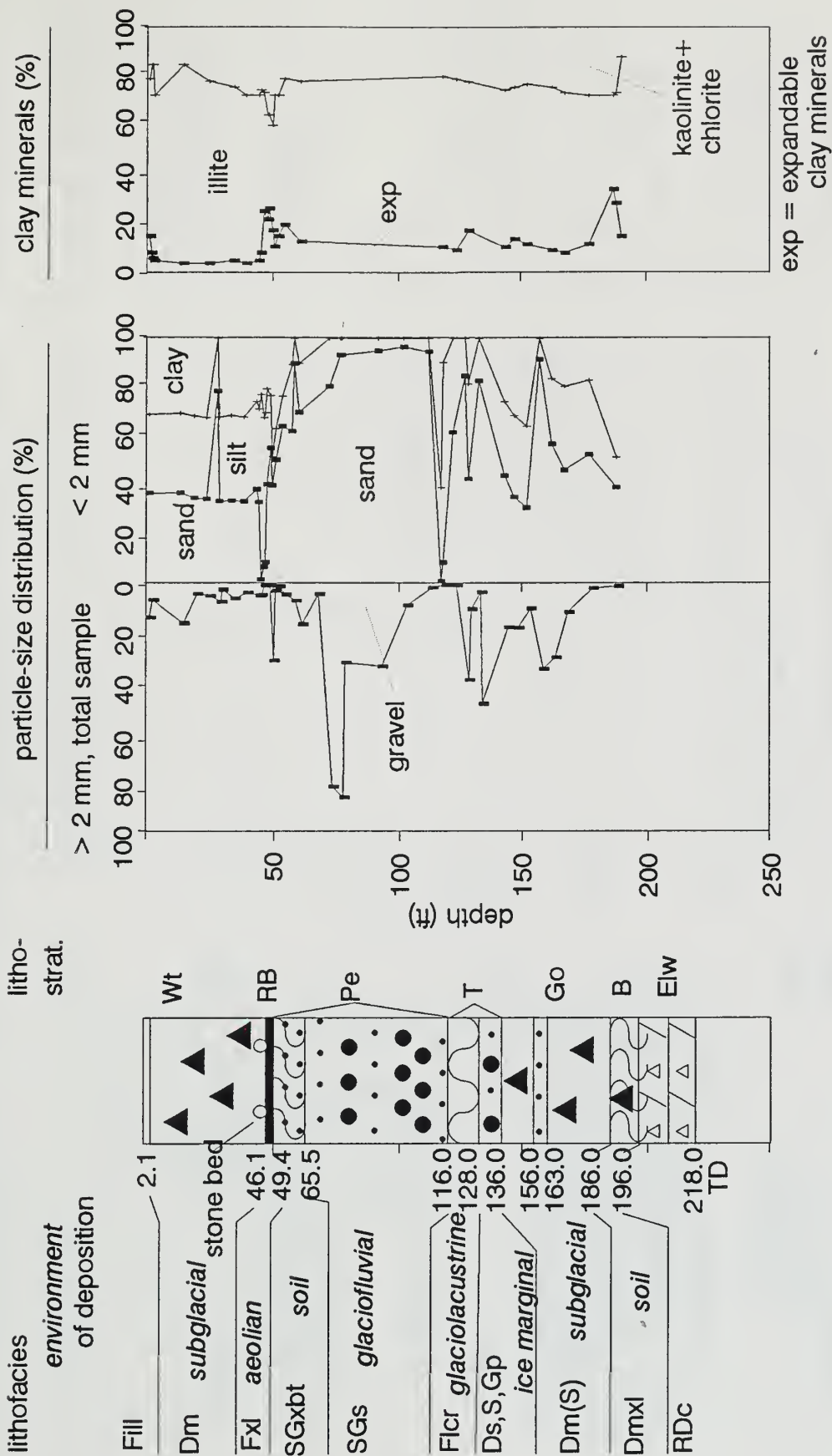


Figure 9 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring MC-8 (elev. 945 ft., Hebron 7 1/2' quad).

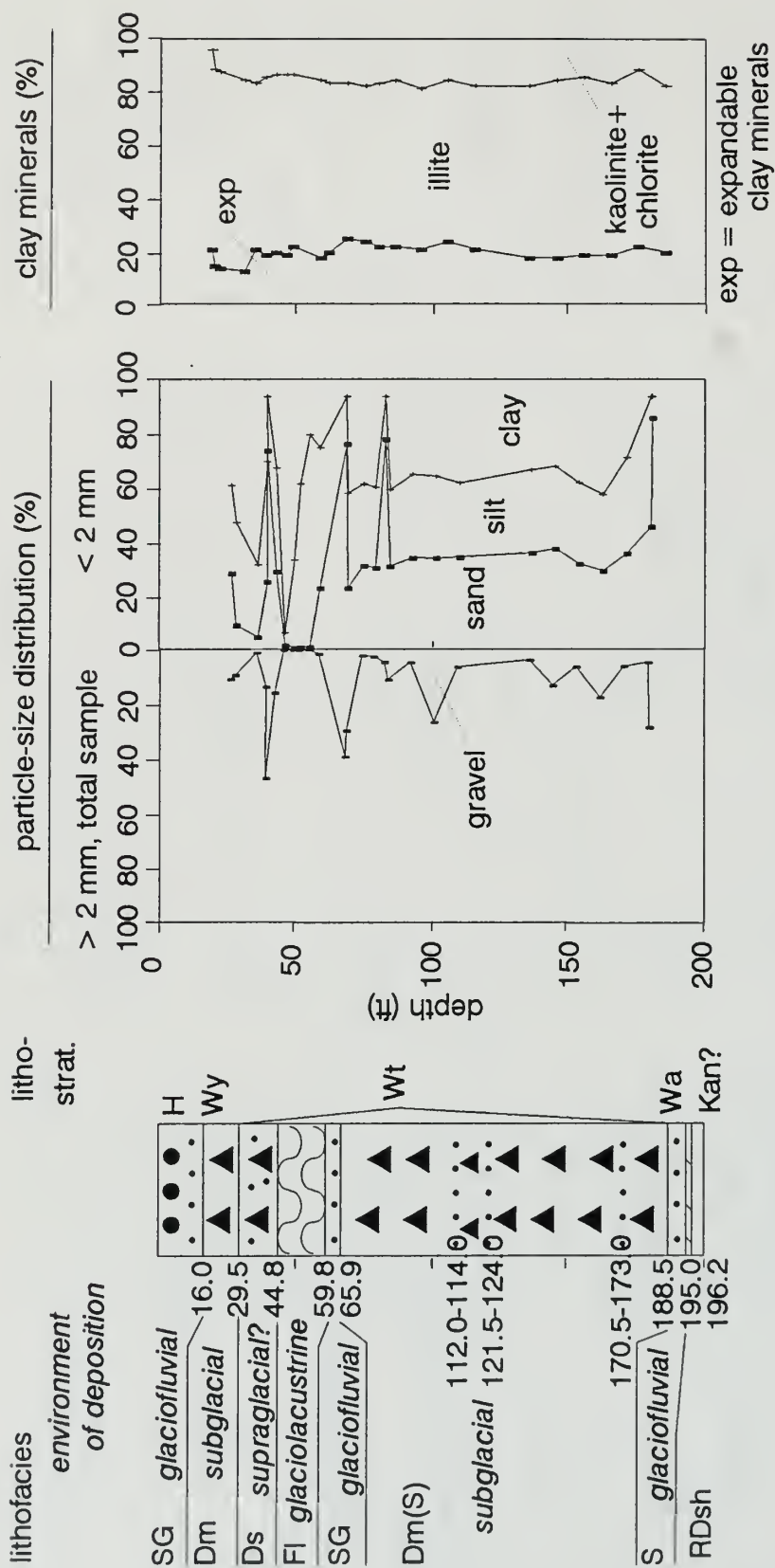


Figure 10 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring MC-9 (elev. 850 ft., McHenry 7 1/2' quad).

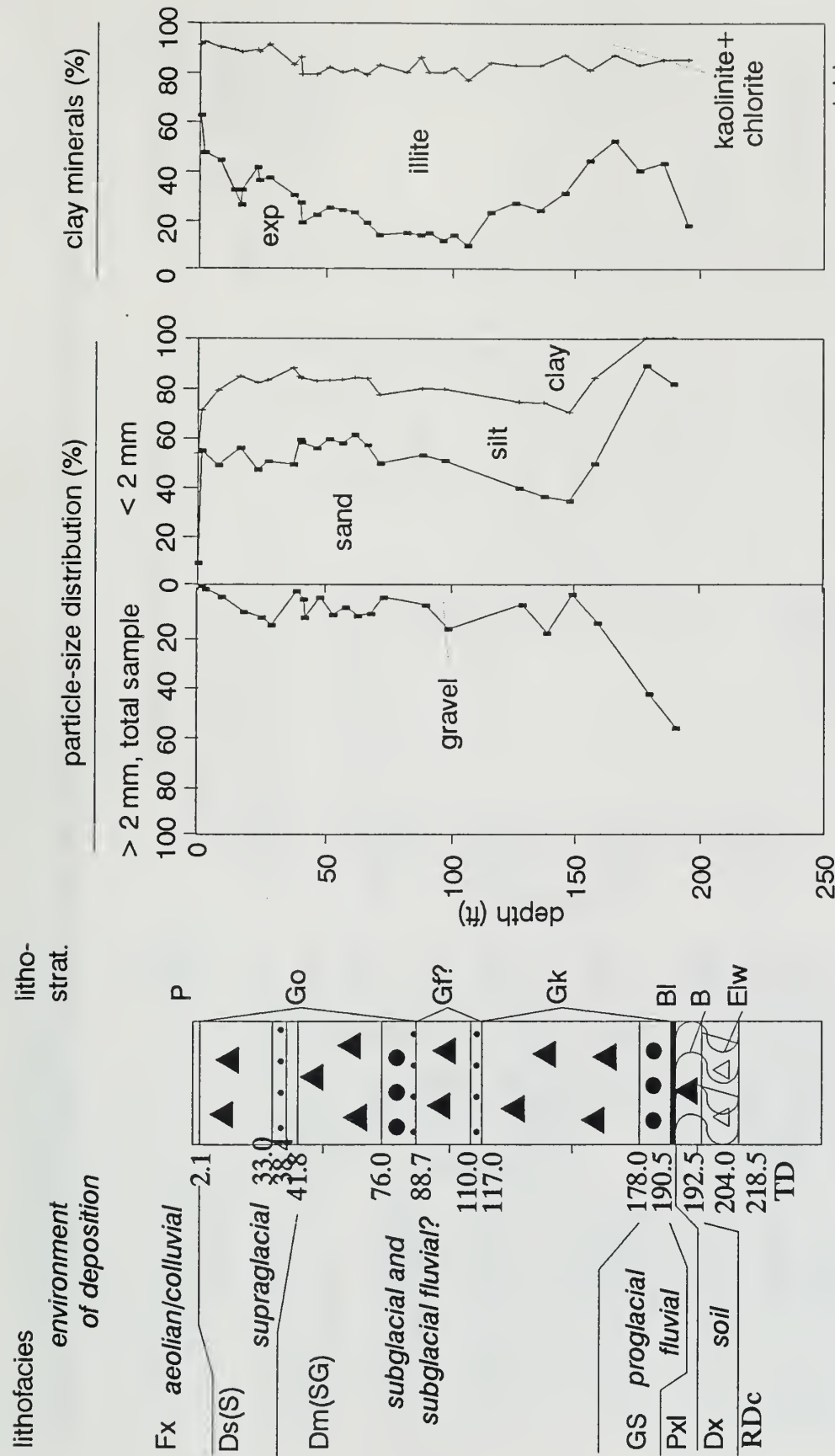


Figure 11 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring MC-10 (elev. 840 ft., Garden Prairie 7 1/2' quad).

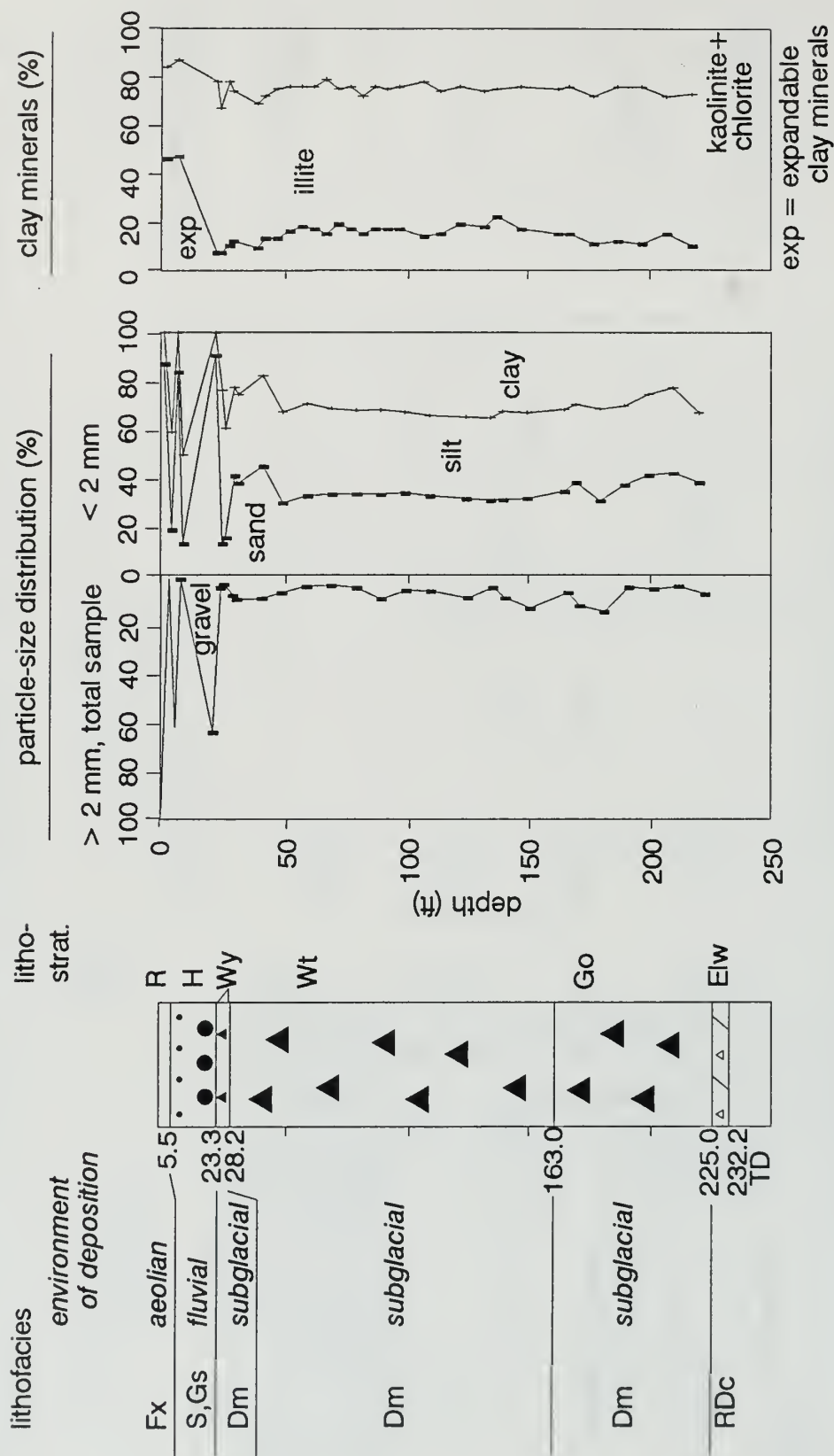


Figure 12 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring MC-11 (elev. 928 ft., Woodstock 7 1/2' quad).

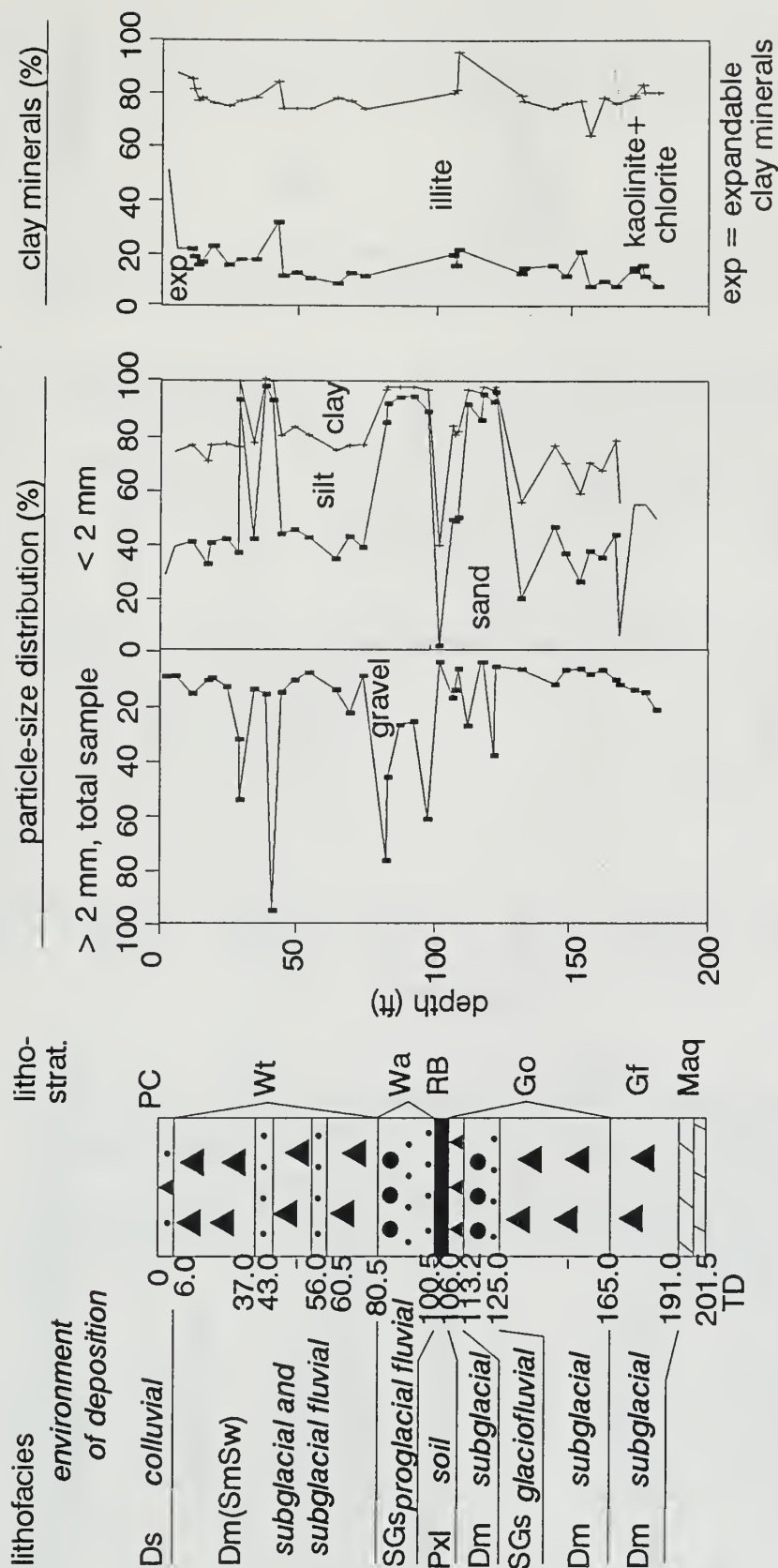


Figure 13 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring MC-12 (elev. 895 ft., Huntley 7 1/2' quad).

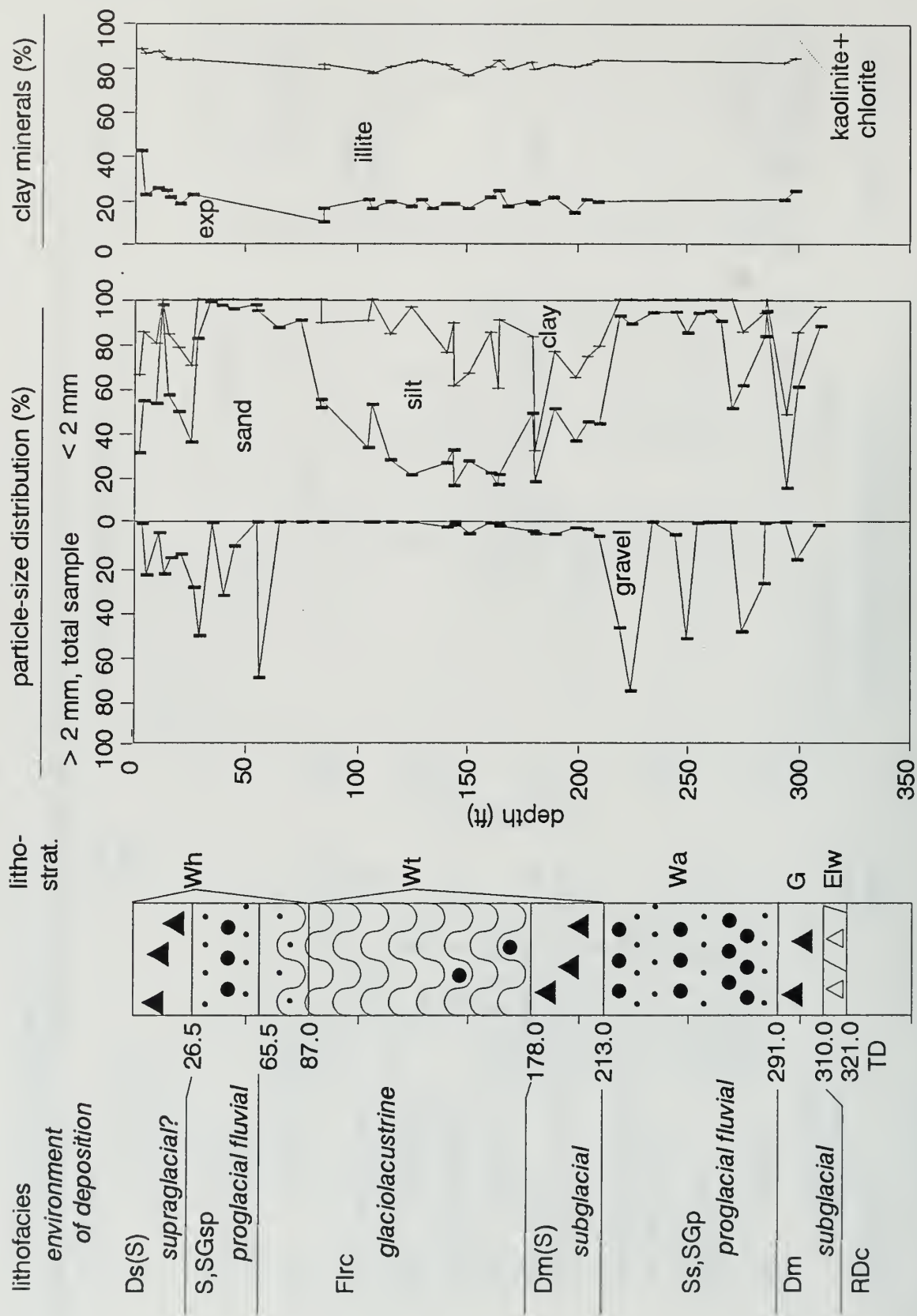


Figure 14 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring MC-13 (elev. 929 ft., Fox Lake 7 1/2' quad).

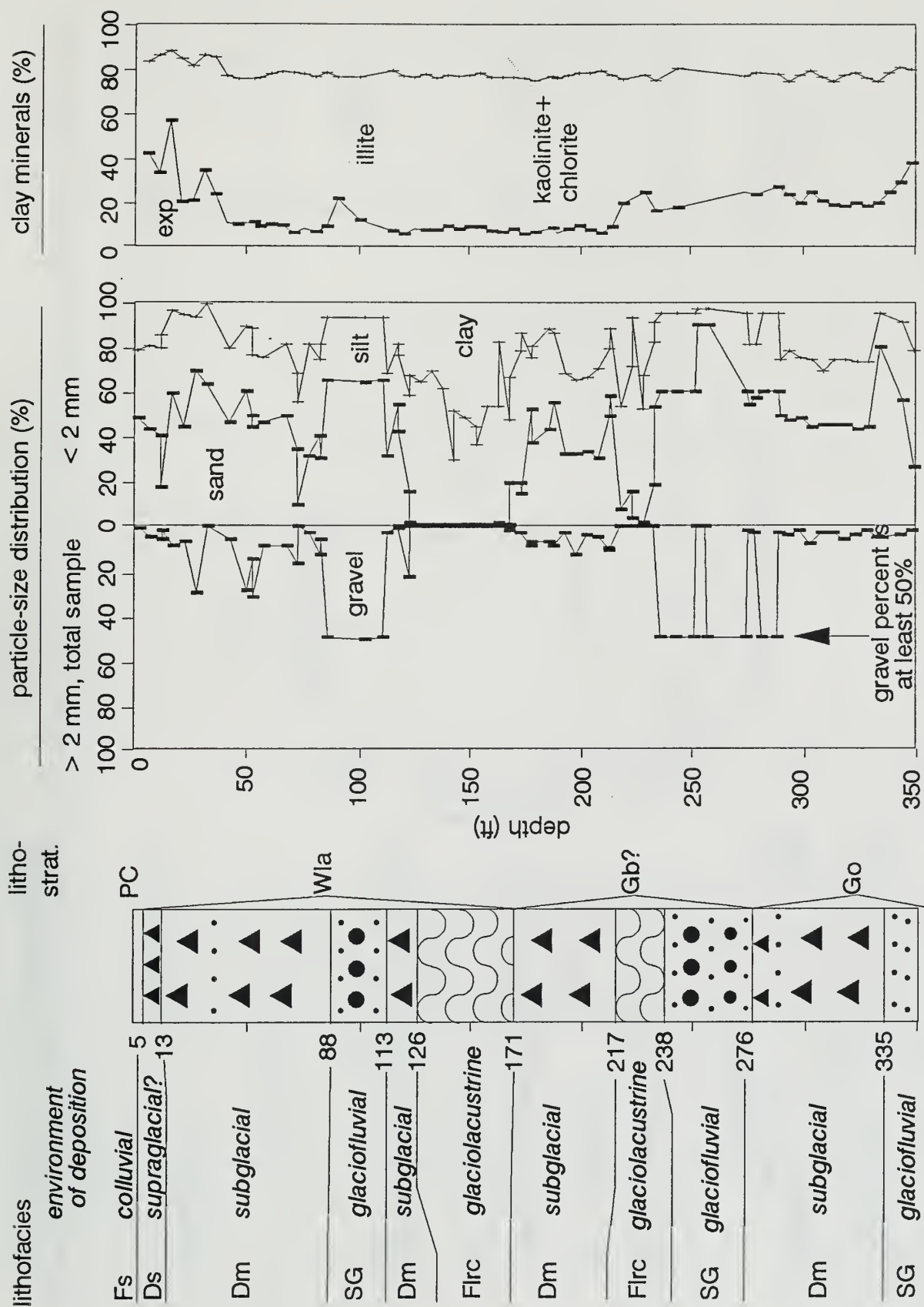


Figure 15 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring NIPC 1 (elev. 975 ft., Capron 7 1/2' quad).

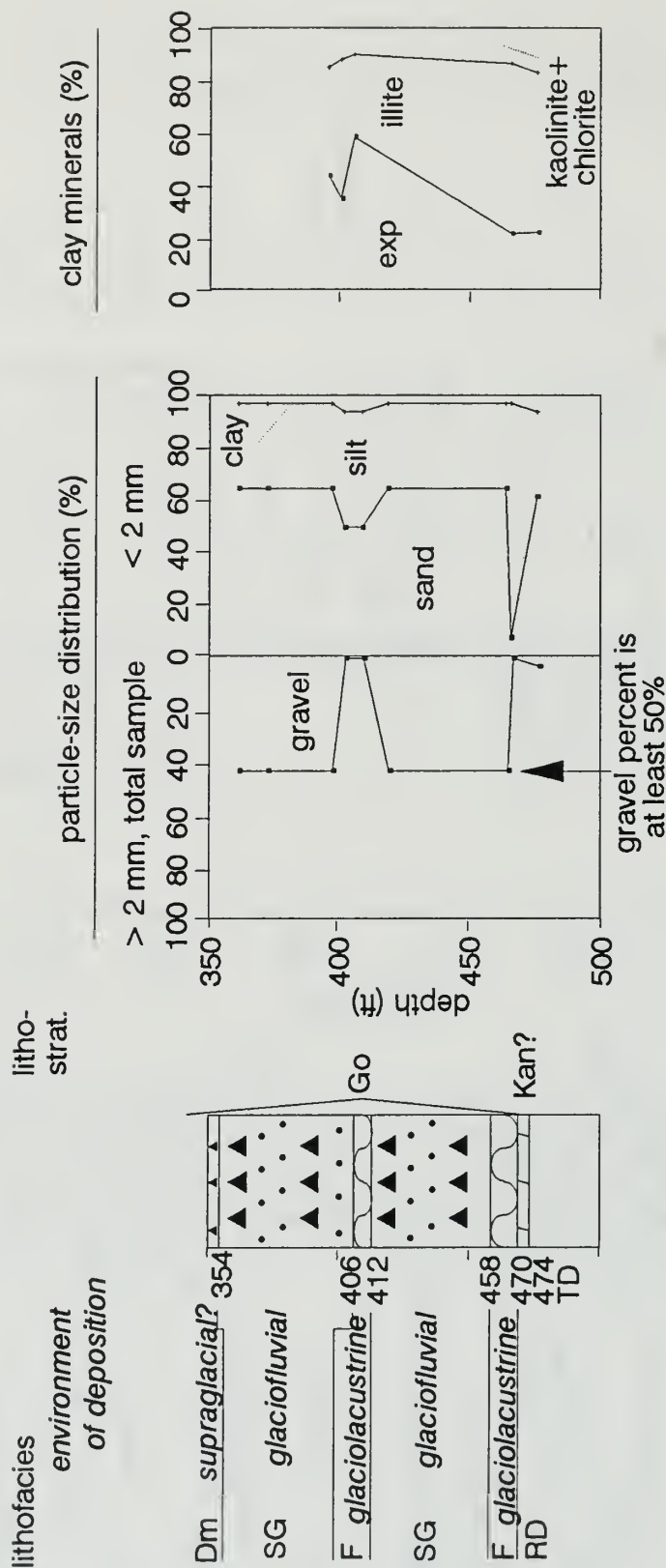


Figure 15 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring NIPC 1 (elev. 975 ft., Capron 7 1/2' quad)(continued).

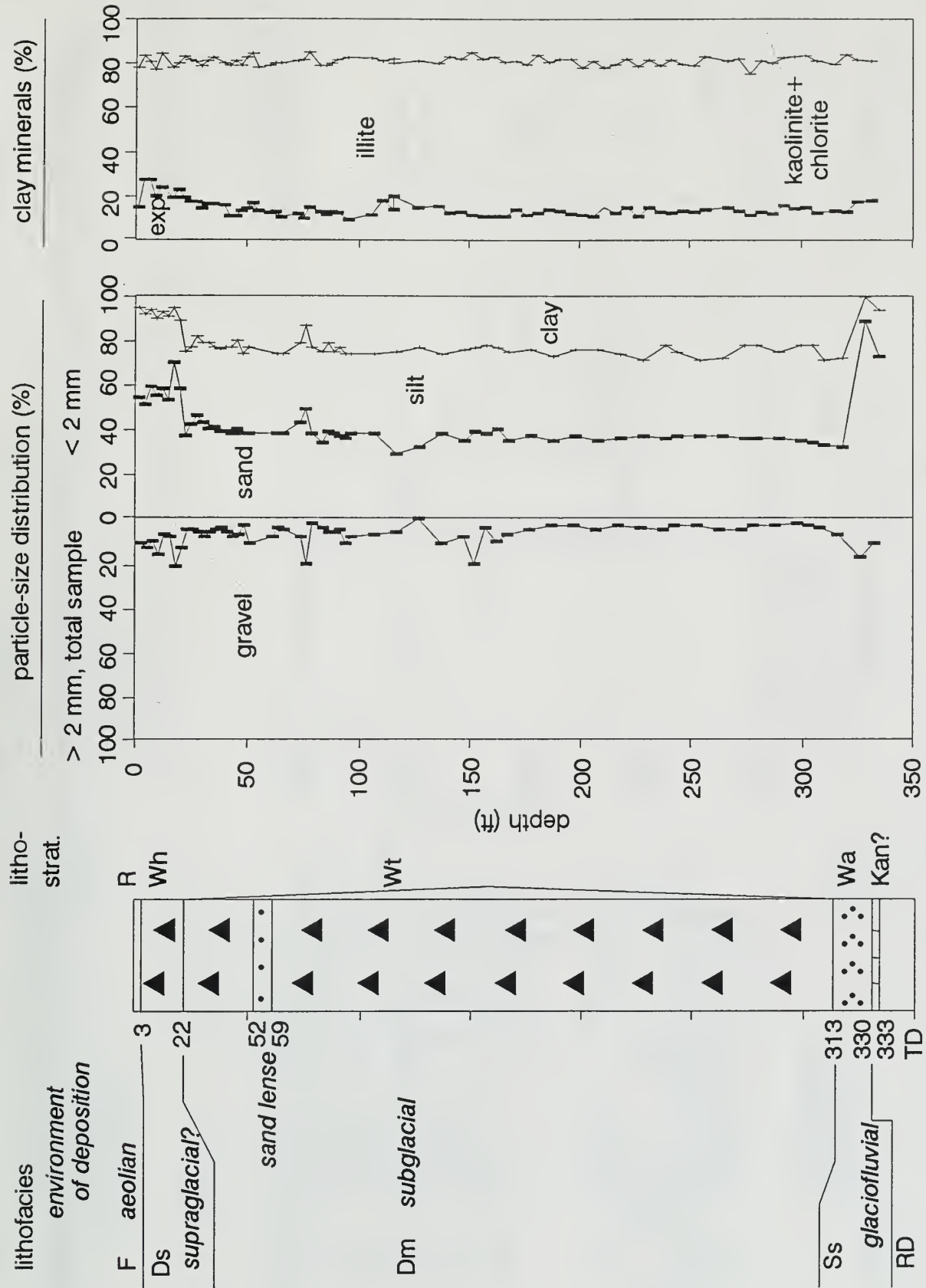


Figure 16 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring NIPC 2 (elev. 1160 ft., Harvard 7 1/2' quad).

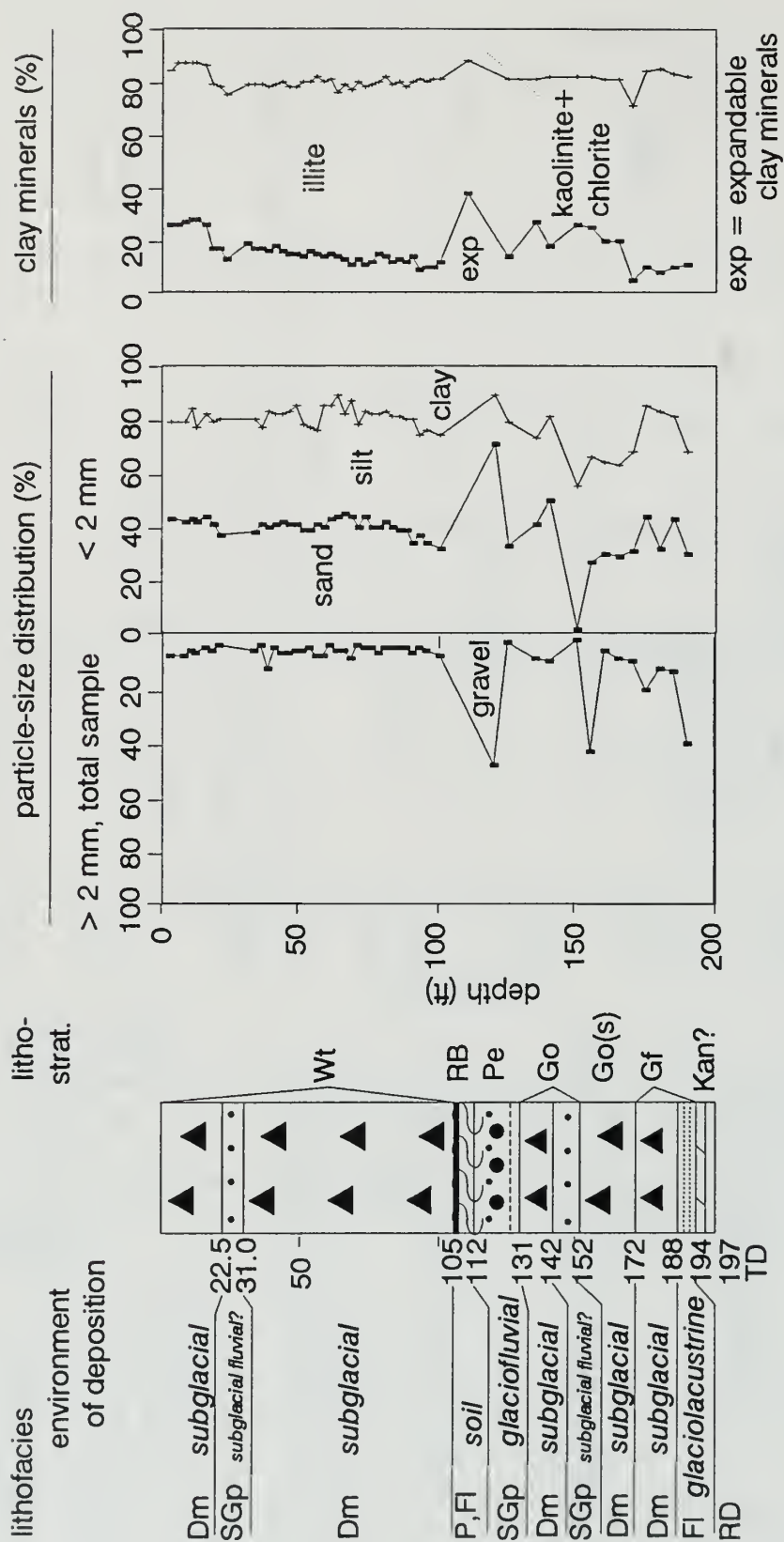


Figure 17 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring NIPC 3 (elev. 902 ft., Marengo South 7 1/2' quad).

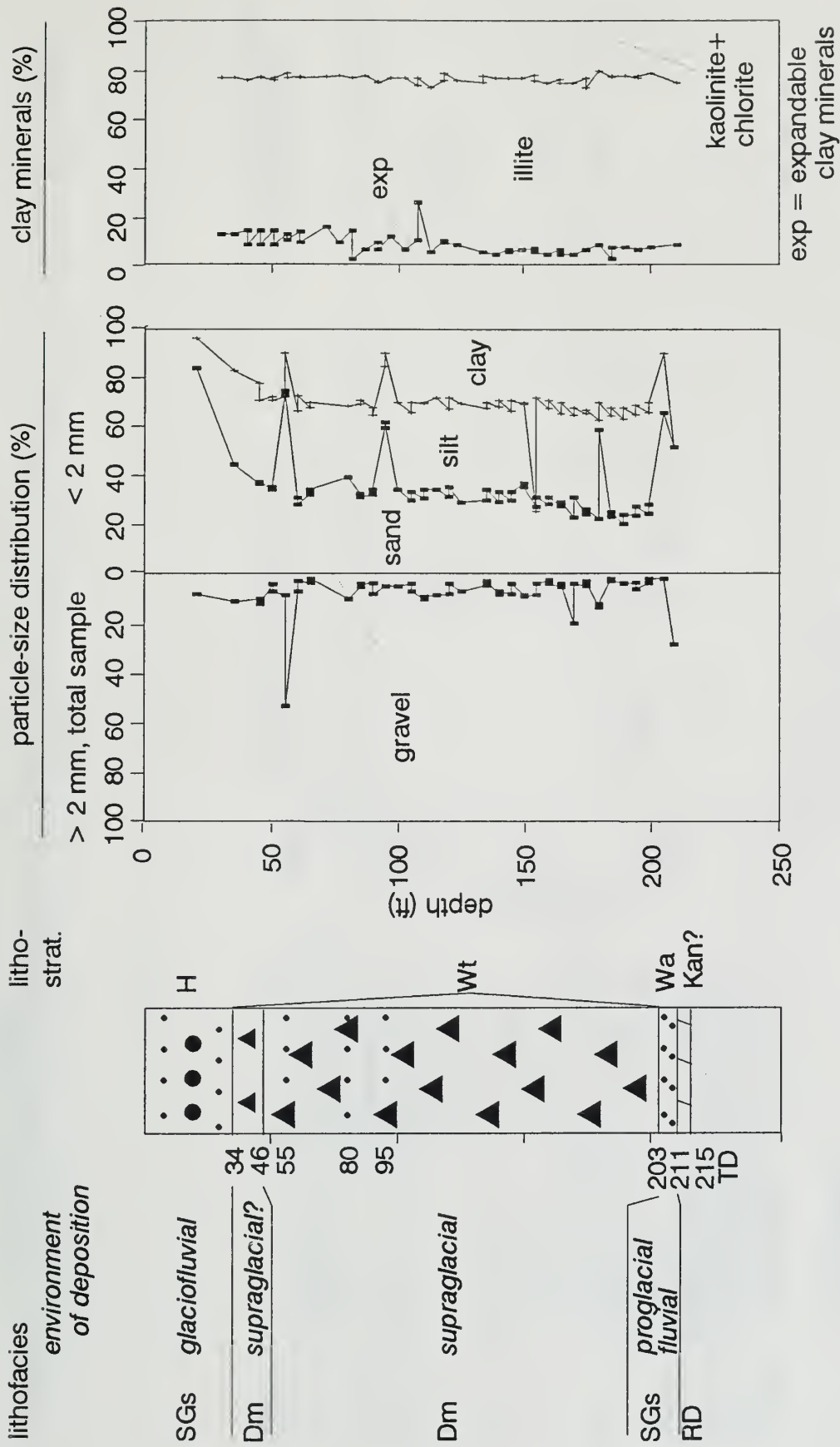


Figure 18 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring NIPC 4 (elev. 895 ft., Crystal Lake 7 1/2' quad).

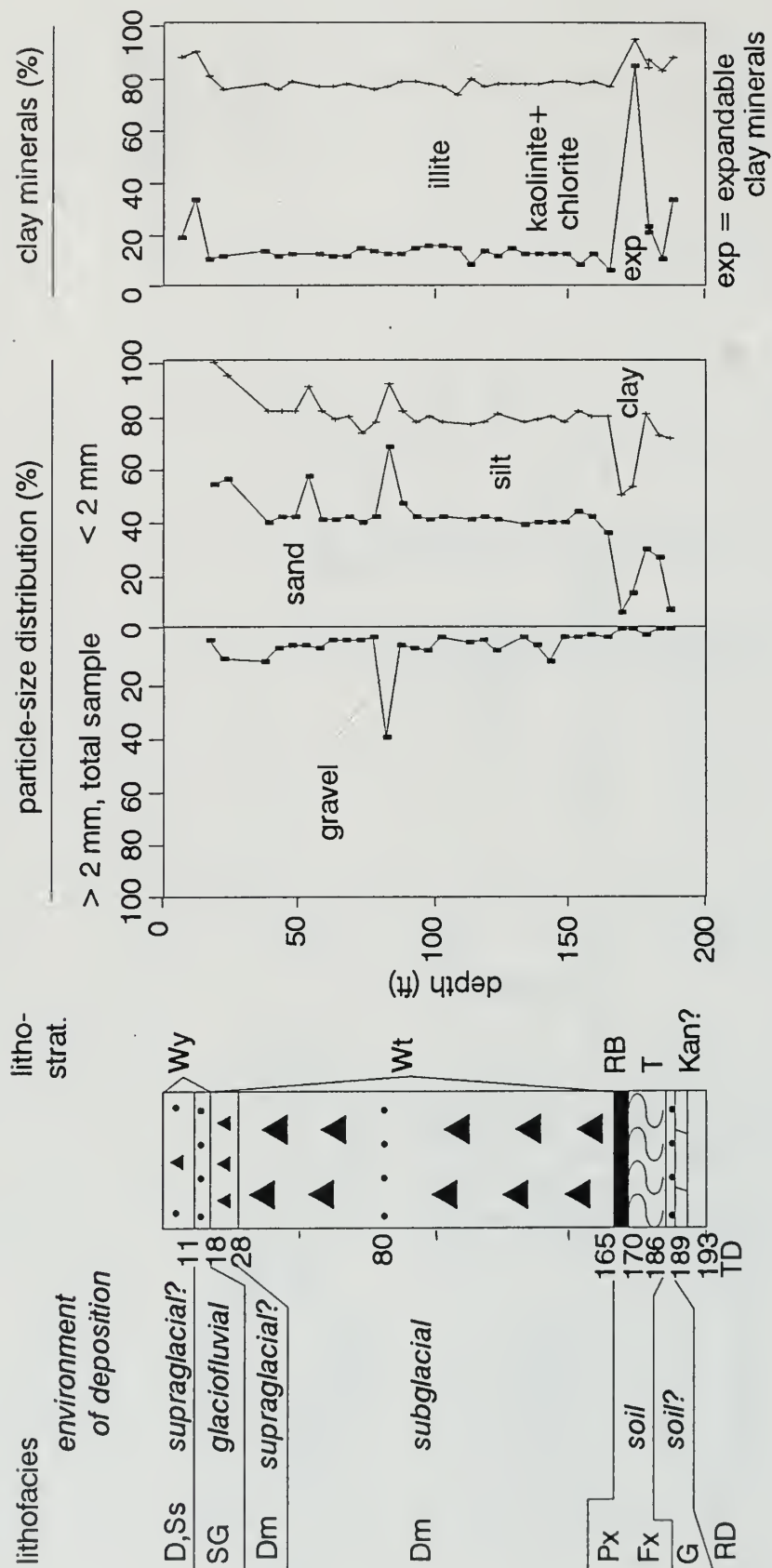


Figure 19 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring NIPC 5 (elev. 900 ft., Crystal Lake 7 1/2' quad).

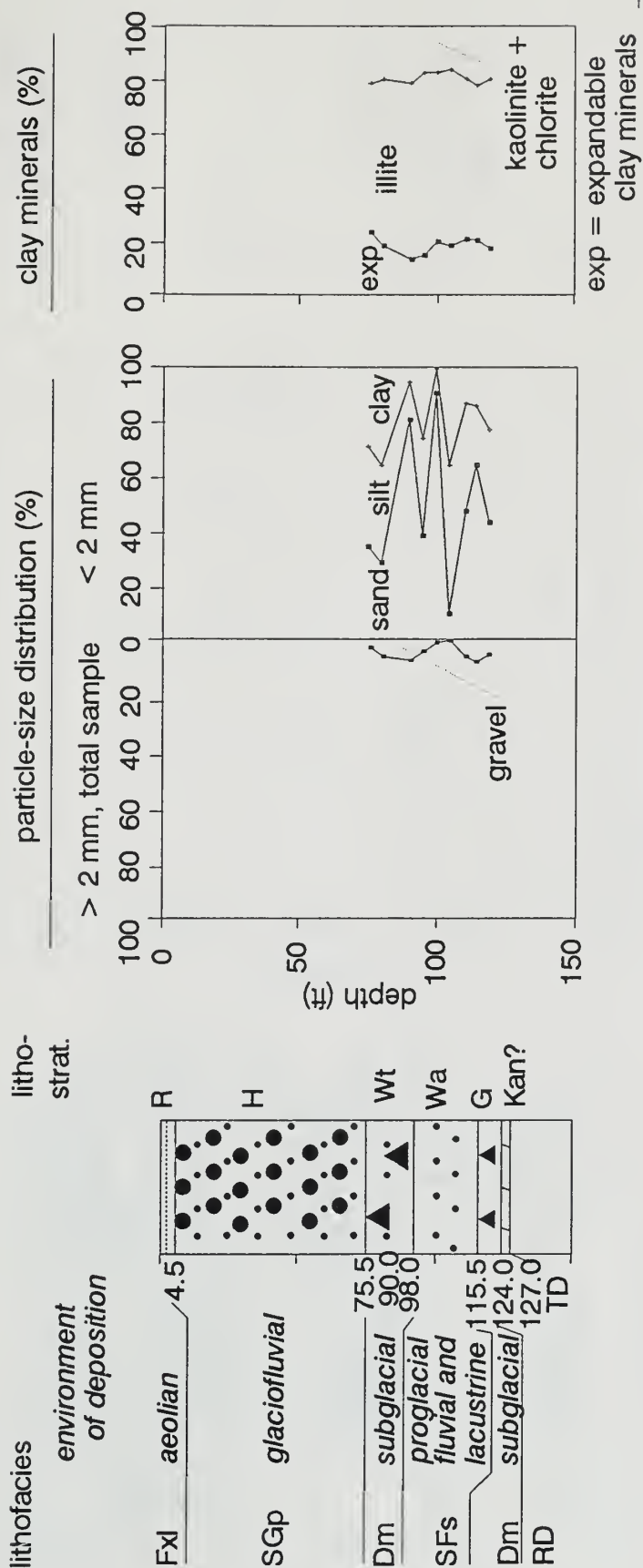


Figure 20 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring NIPC 6 (elev. 810 ft., Marengo North 7 1/2' quad).

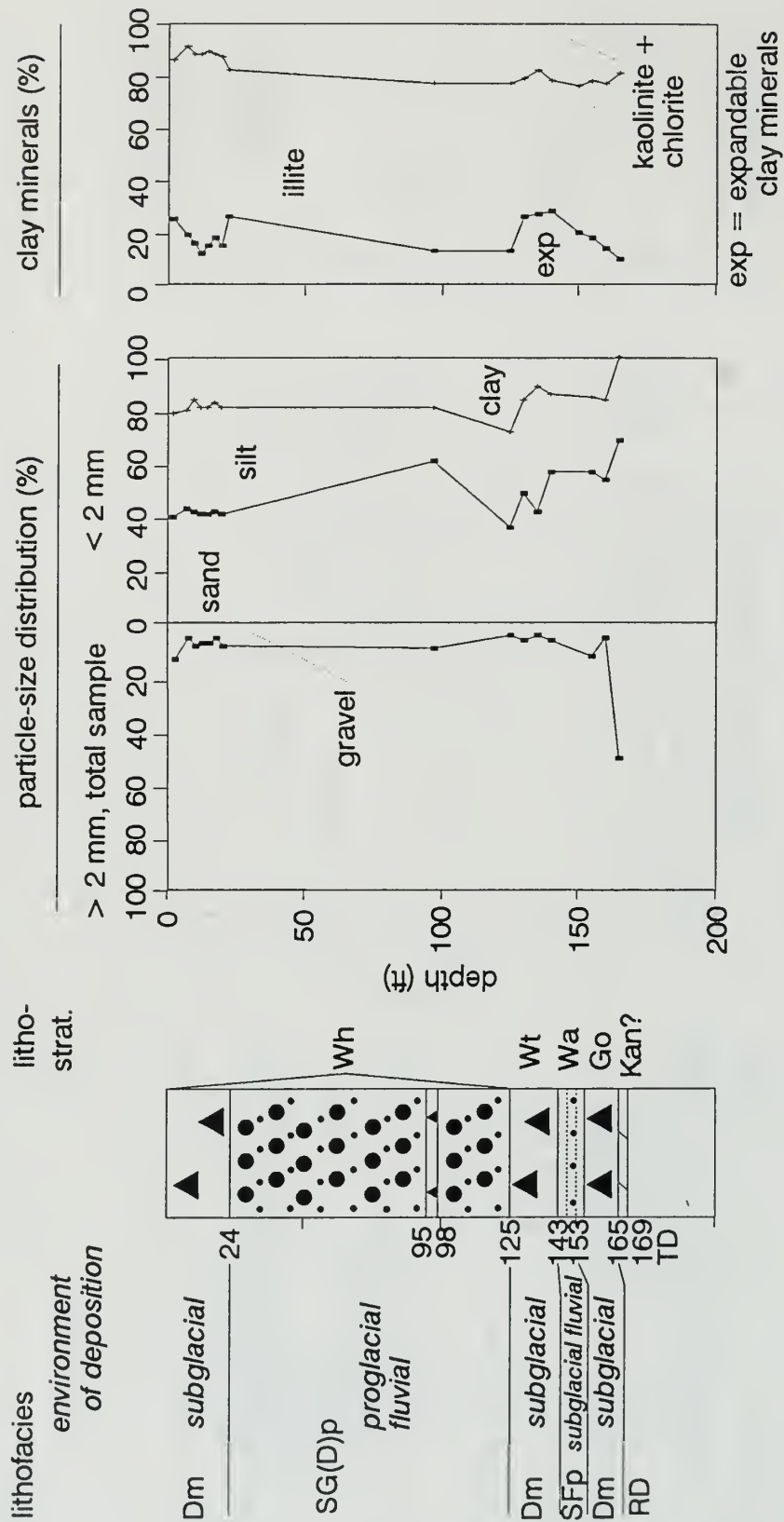


Figure 21 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring NIPC 7 (elev. 885 ft., Woodstock 7 1/2' quad).

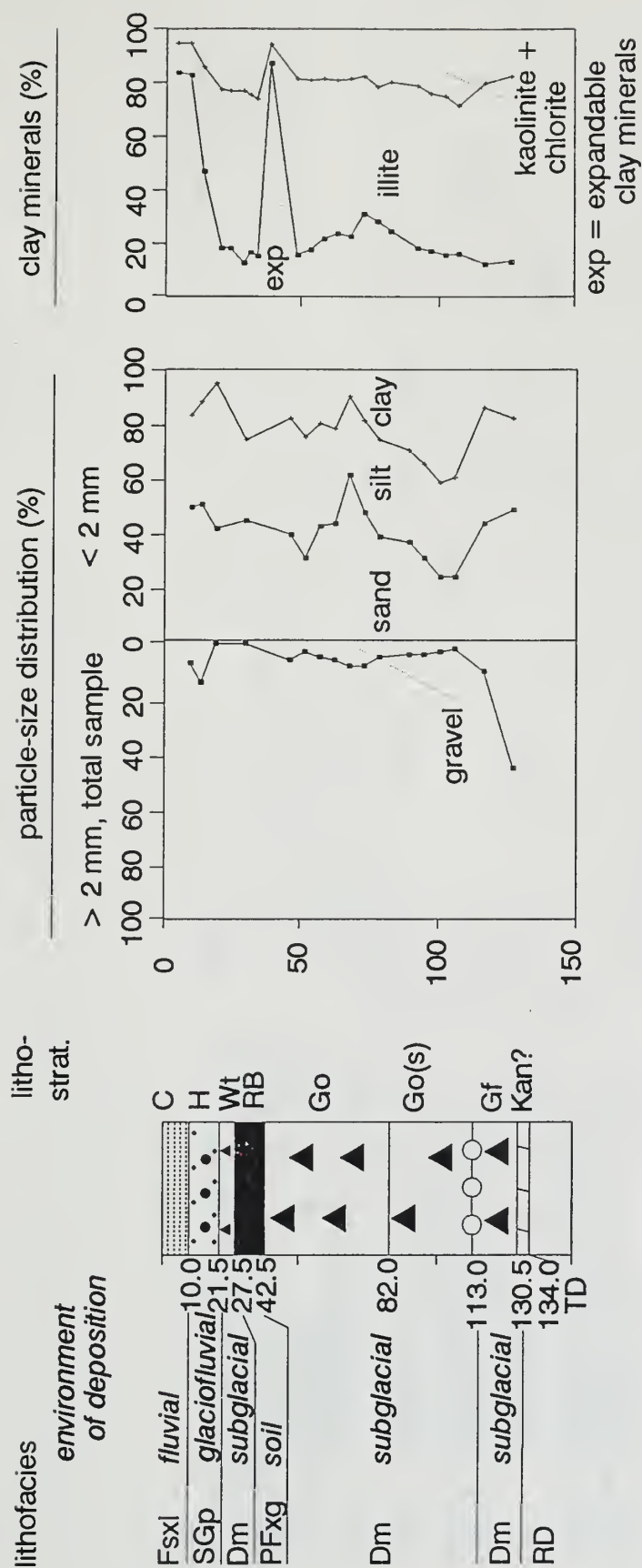


Figure 22 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring NIPC 8 (elev. 910 ft., Harvard 7 1/2' quad).

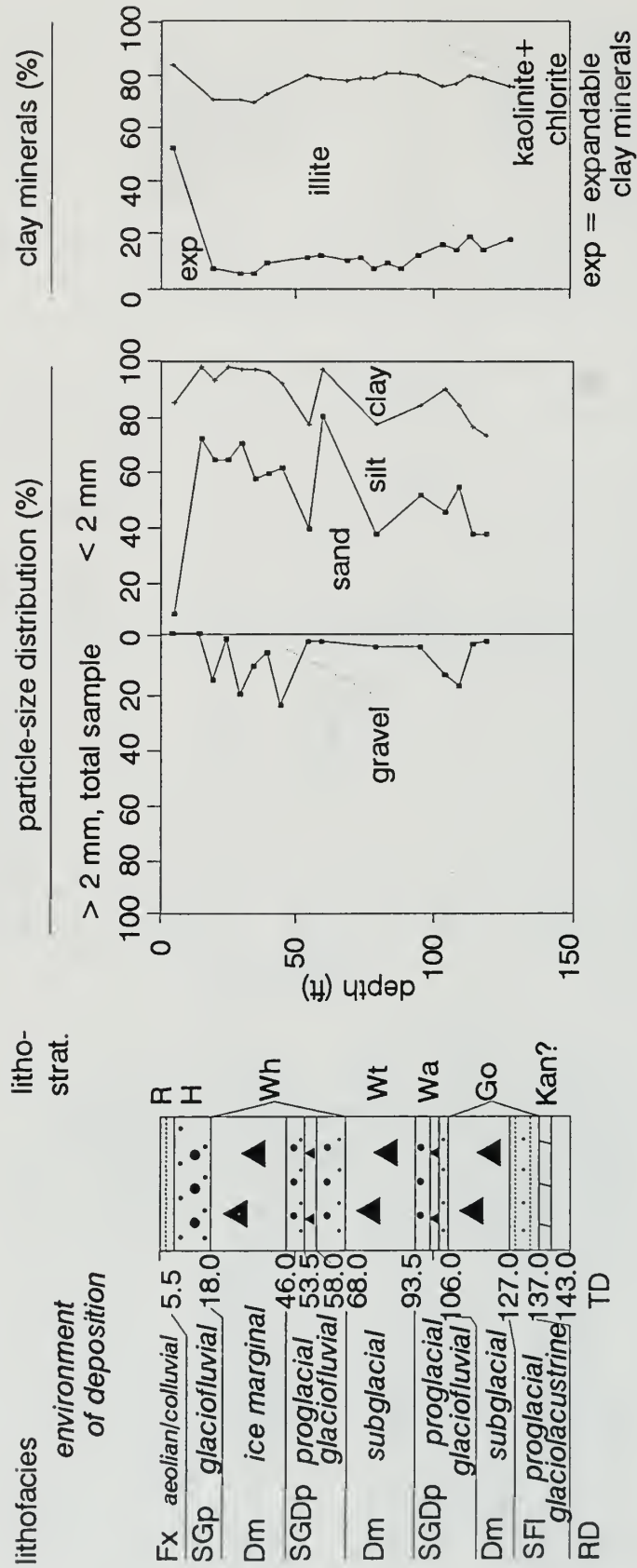


Figure 23 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring NIPC 9 (elev. 875 ft., Hebron 7 1/2' quad).

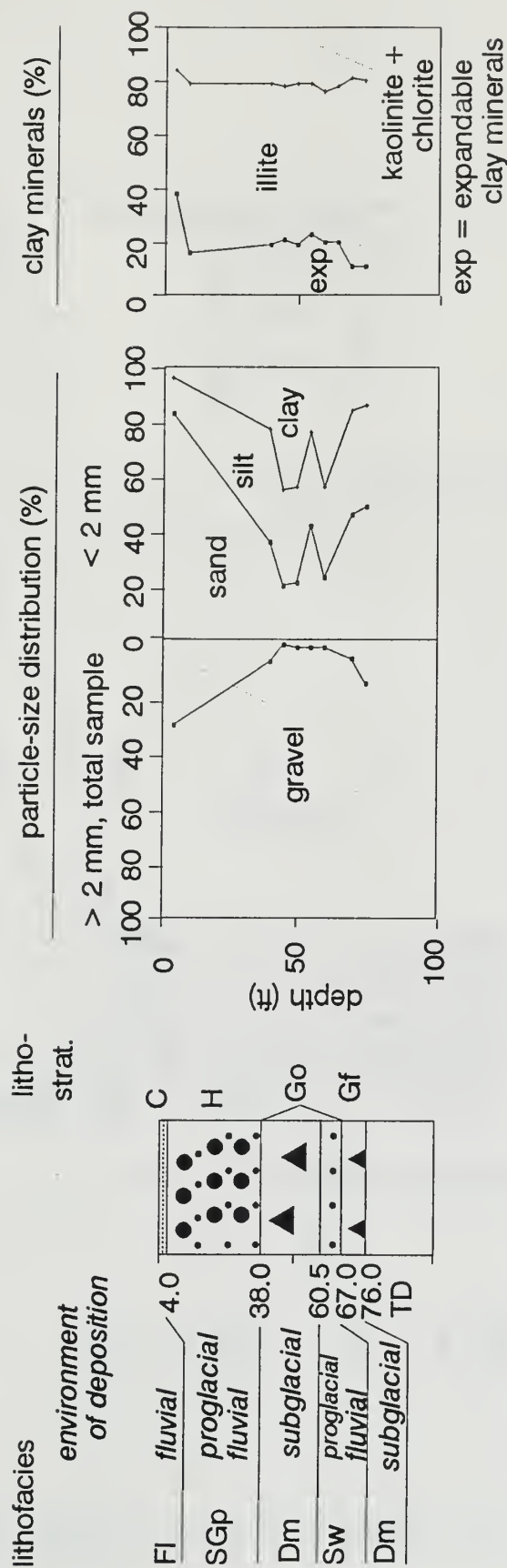


Figure 24 Lithofacies log, lithostratigraphic units, and particle-size and clay mineral data for boring NIPC 10 (elev. 825 ft., Marengo South 7 1/2' quad).

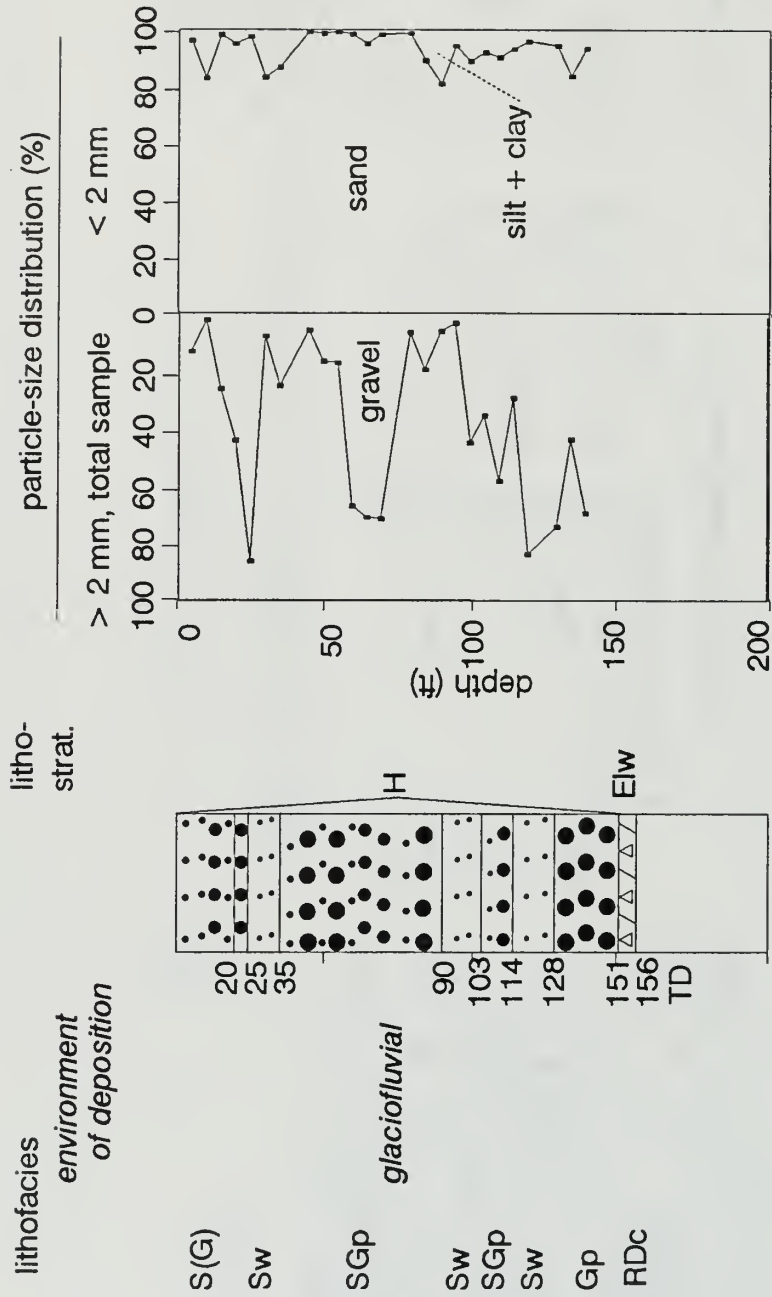


Figure 25 Lithofacies log, lithostratigraphic units, and particle-size data for boring NIPC 11 (elev. 760 ft., Wauconda 7 1/2' quad).

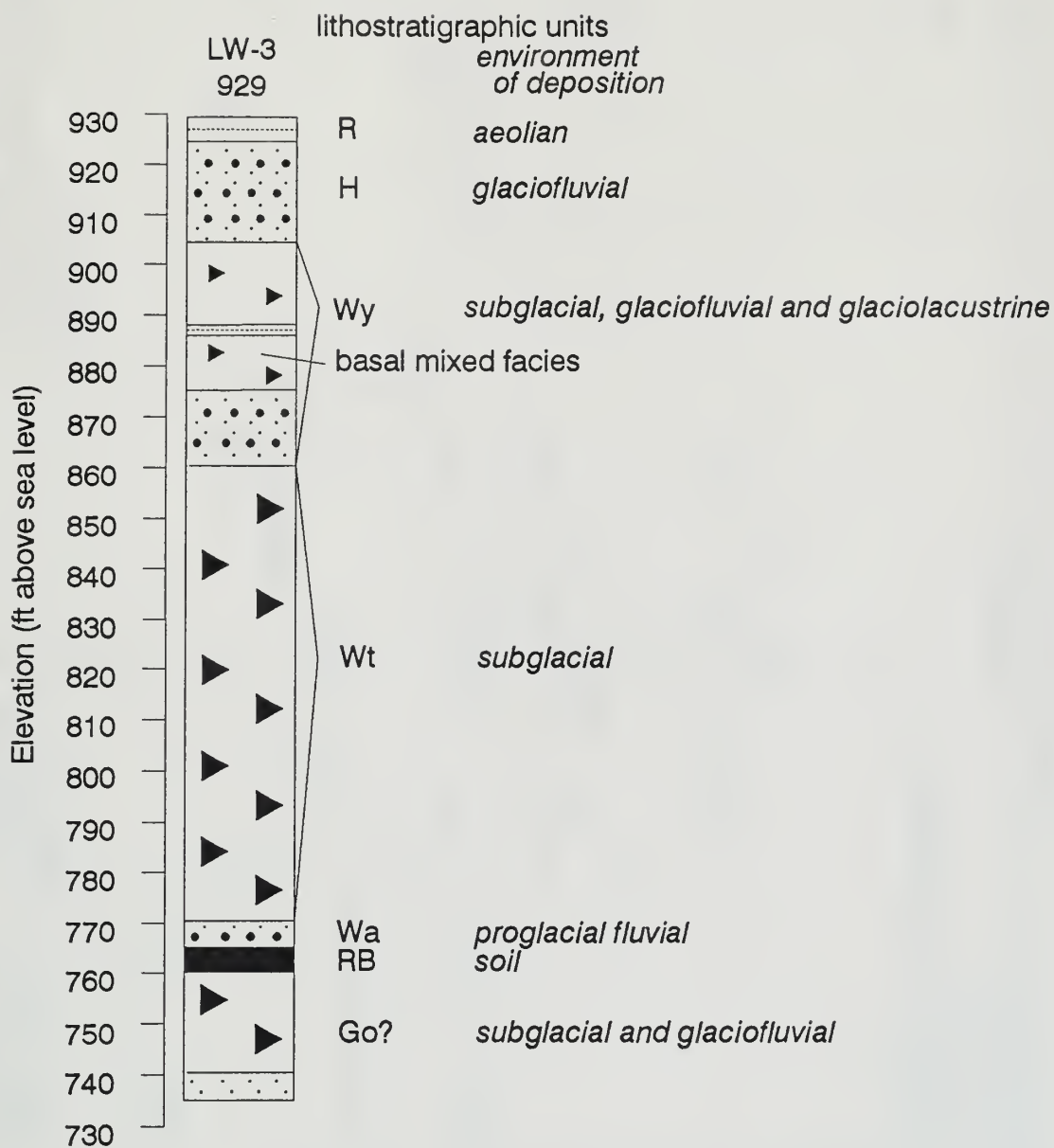


Figure 26 Lithofacies log for boring LW-3, proposed Davis Road landfill (Woodstock 7 1/2' quad).

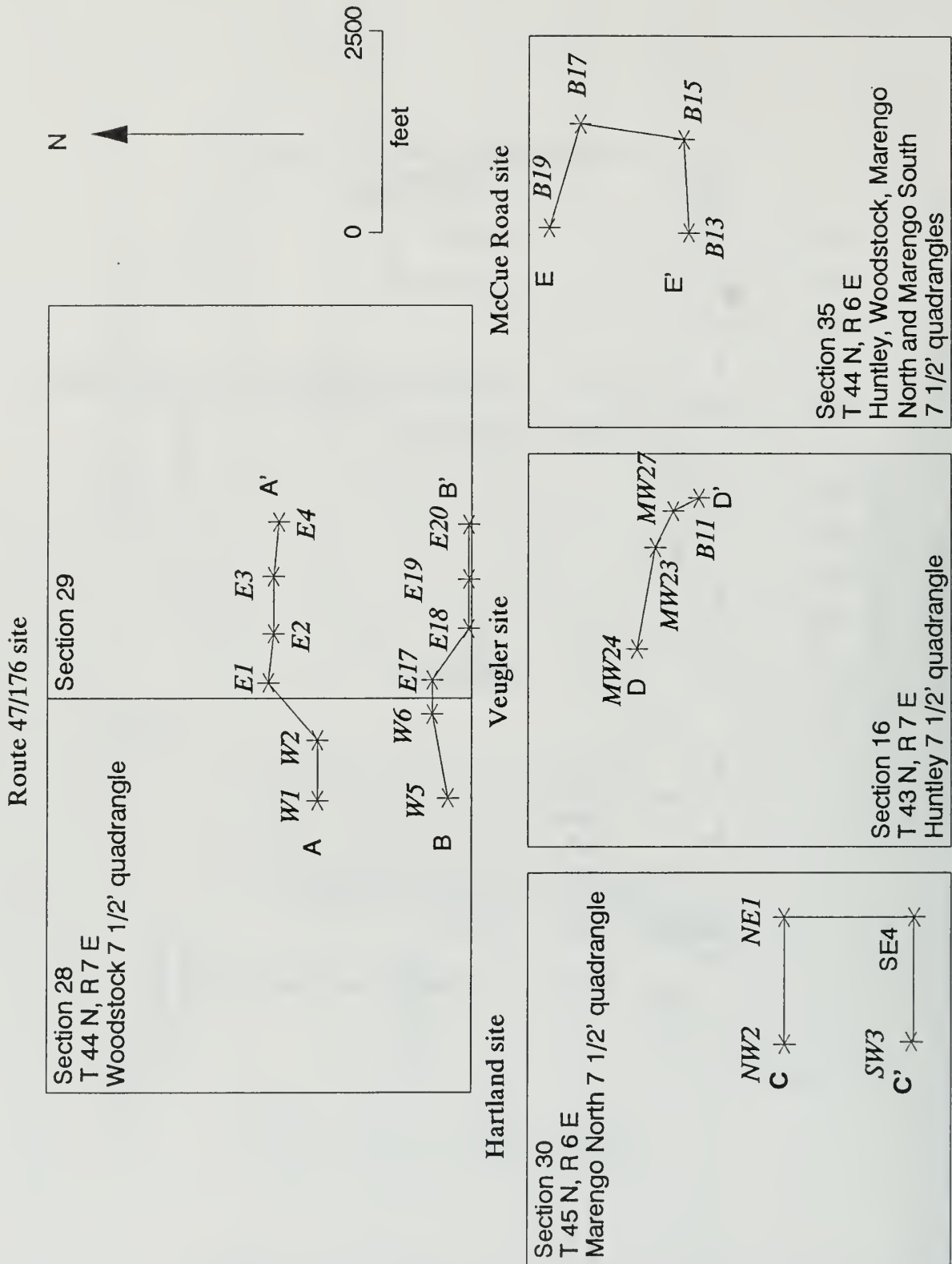


Figure 27 Cross sections lines.

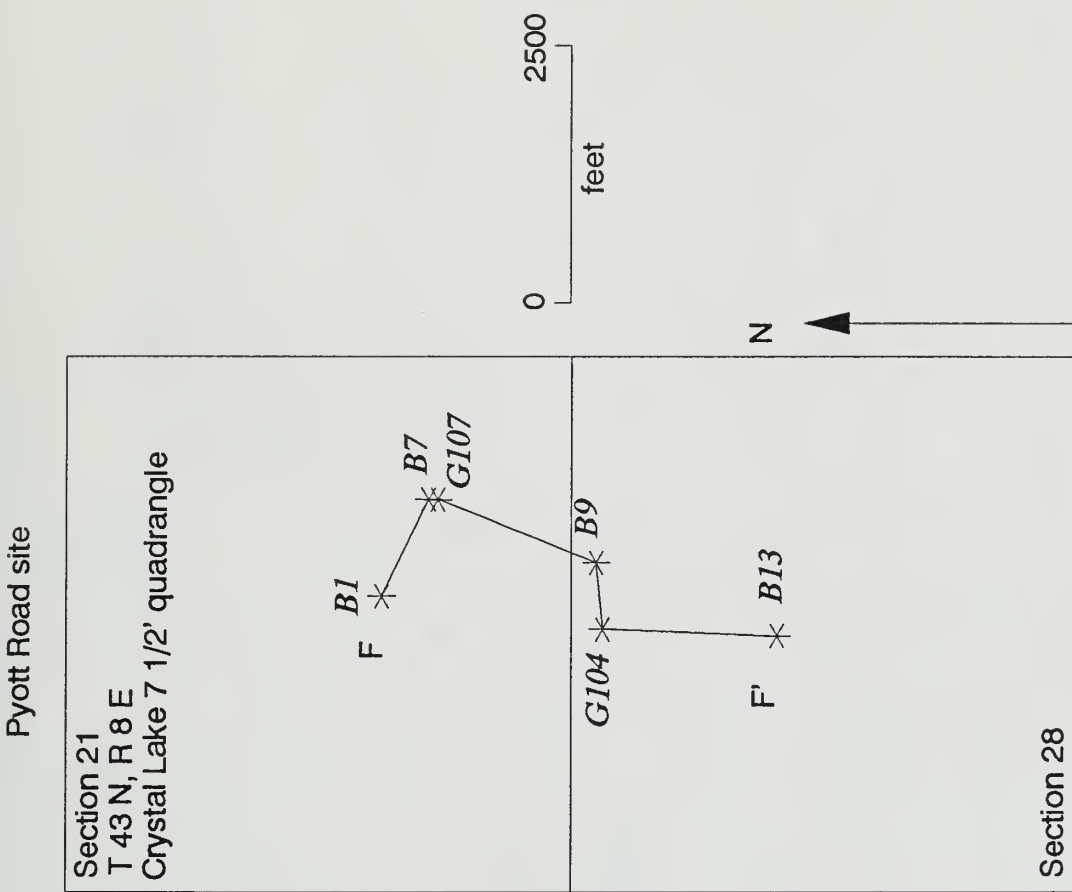


Figure 27 (cont.) Cross section lines.

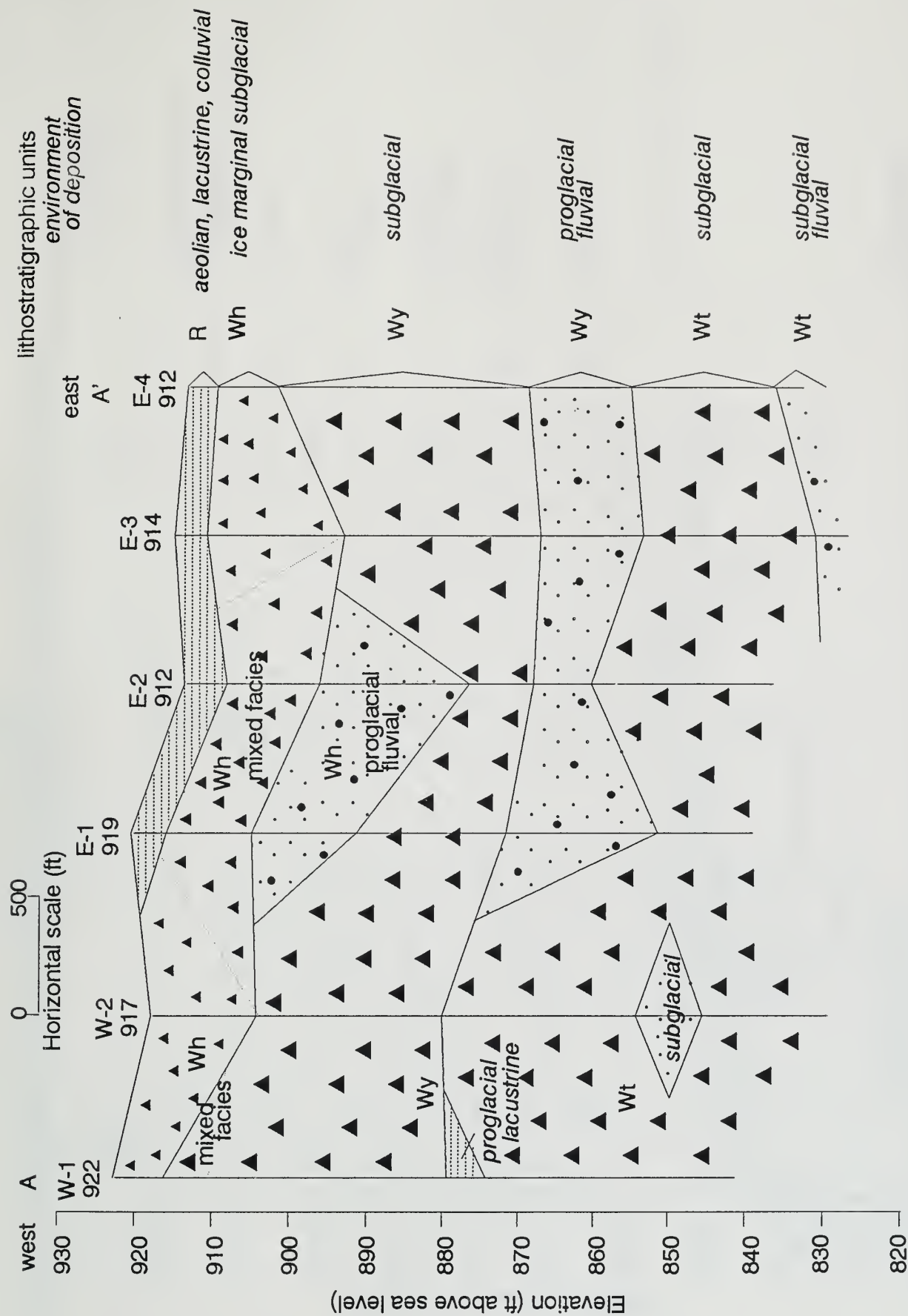


Figure 28 Cross section A-A' from the proposed Route 47/176 landfill (Woodstock 7 1/2' quad).

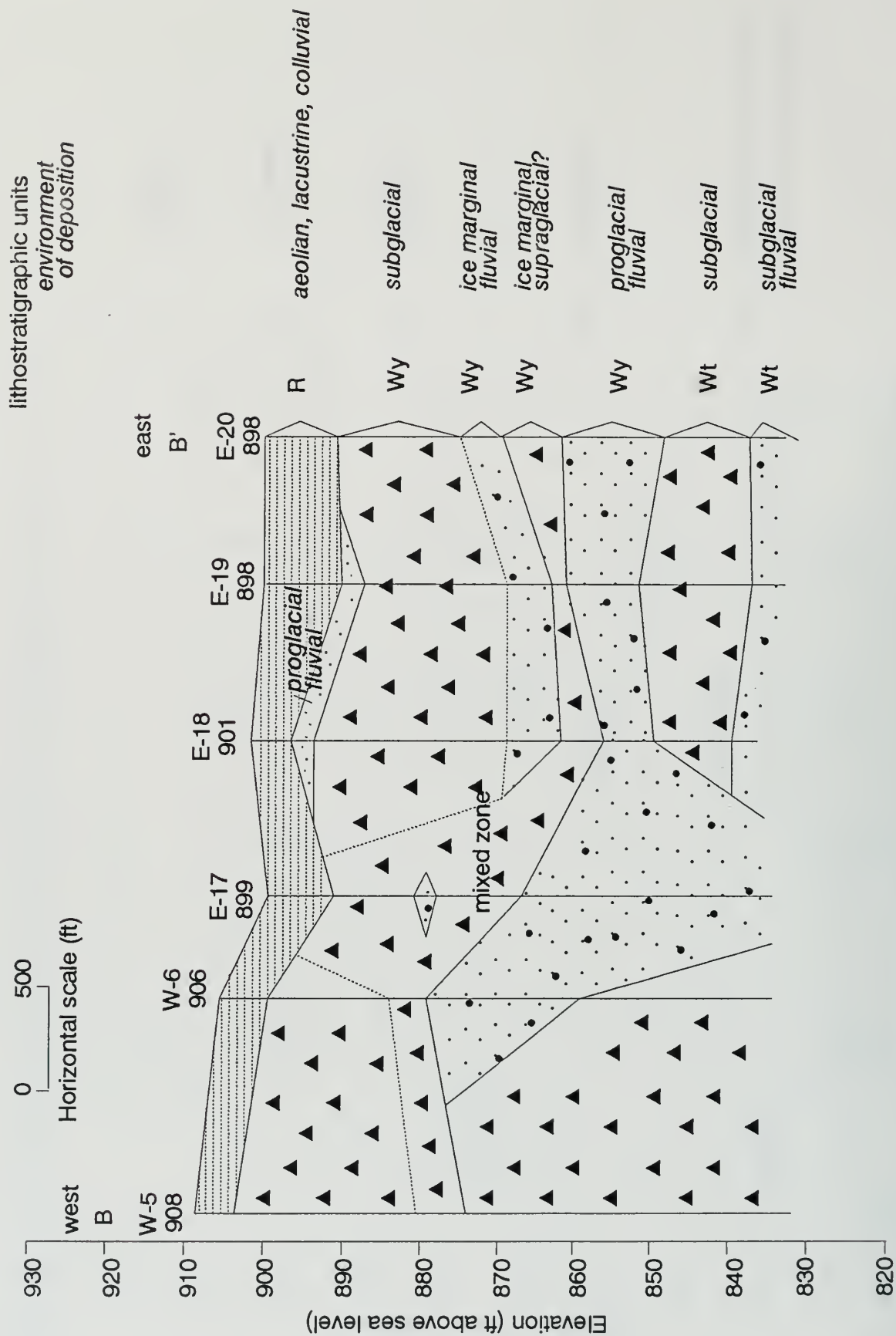


Figure 29 Cross section B-B' from the proposed Route 47/176 landfill (Woodstock 7 1/2' quad).

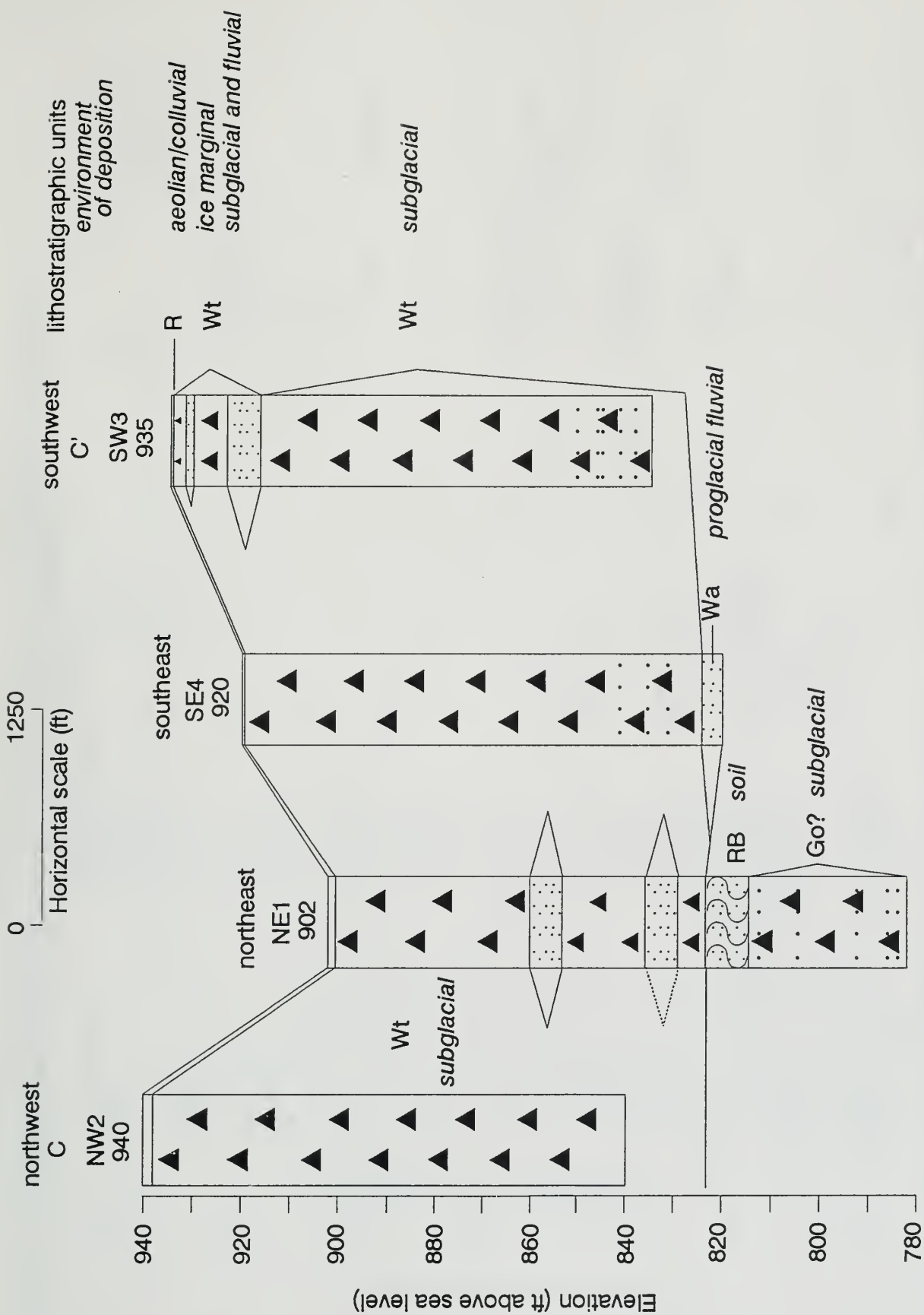


Figure 30 Cross section C-C' from the proposed Hartland landfill (Marengo North 7 1/2' quad).

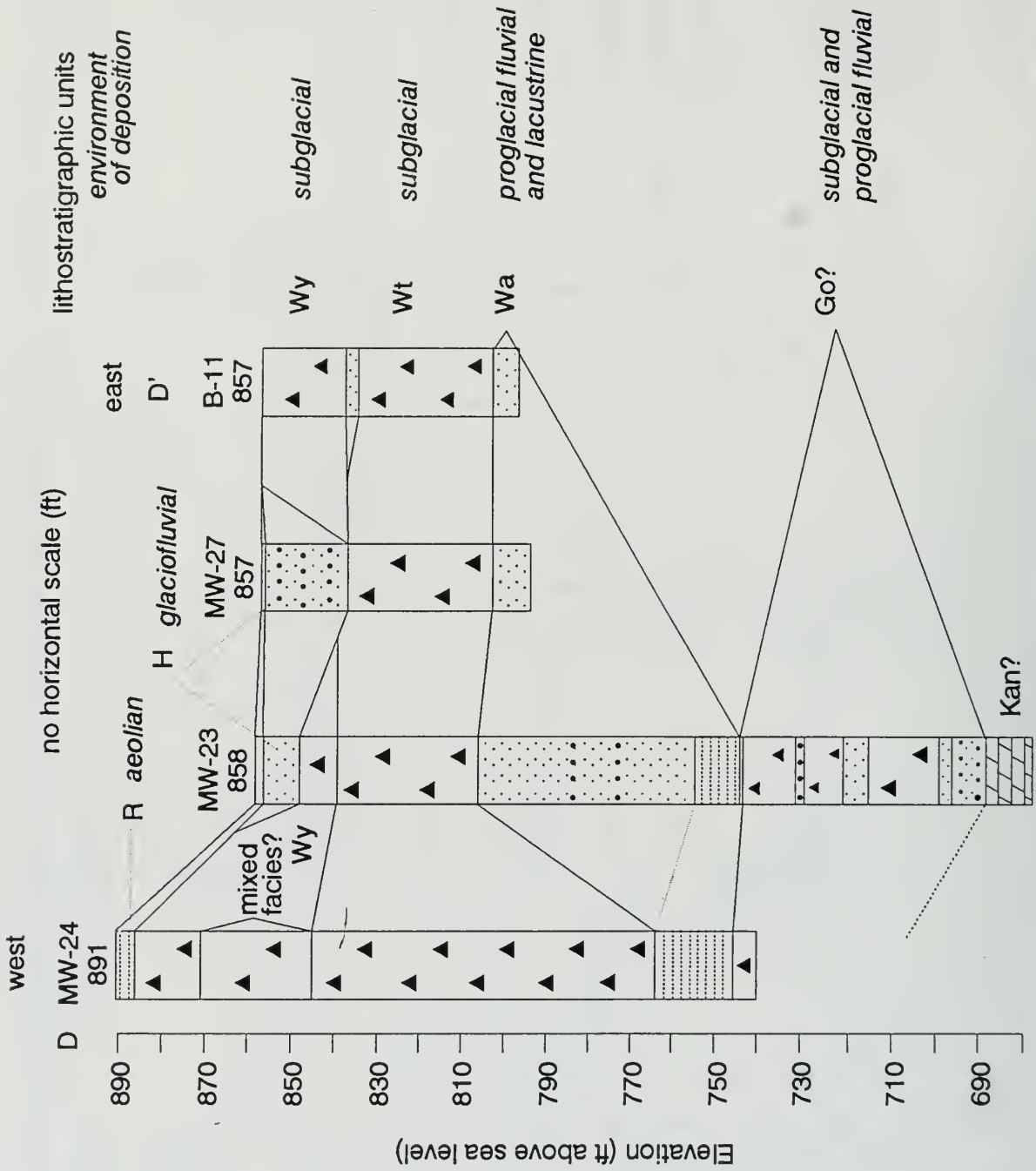


Figure 31 Schematic cross section D-D' from the proposed Veugler landfill (Huntley 7 1/2' quad).

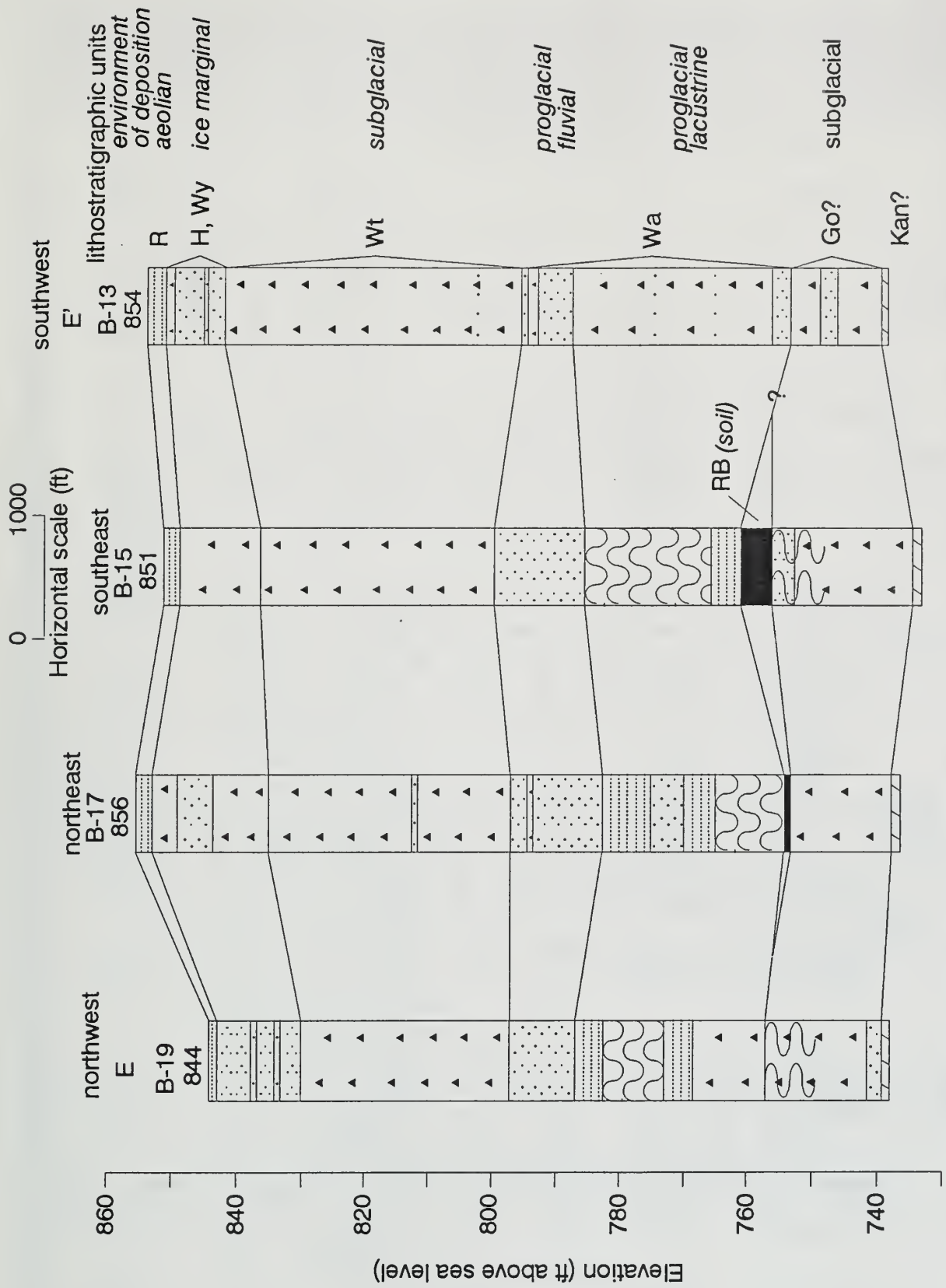


Figure 32 Cross section E-E' from the proposed McCue Road landfill (Woodstock, Huntley, Marengo South and Marengo North 7 1/2' quads).

Table 1. Location of borings in McHenry County

Well No.	Location	Estimated topo map elevation	Quadrangle
McHENRY COUNTY GROUNDWATER PROTECTION			
MC 4	500' NL, 650'WL Sec. 30-46N-5E	850'	Capron
MC 2	750'NL, 1250'EL Sec. 5-45N-5E	895'	Capron
MC 3	50'SL, 2350'EL Sec. 22-46N-5E	910'	Capron
MC 4	500'EL, 650'NL Sec. 27-45N-7E	910'	Woodstock
MC 5	550'WL, 2350'NL Sec. 8-44N-8E	788'	McHenry
MC 6	not drilled		
MC 7	1000'NL, 750'WL Sec. 29-46N-8E	795'	Richmond
MC 8	175'NL, 146'EL Sec. 6-46N-7E	945'	Hebron
MC 9	400'NL, 100'EL Sec. 29-45N-8E	850'	McHenry
MC 10	215'NL, 10'EL Sec. 30-45N-5E	910'	Garden Prairie
MC 11	1500'SL, 1050'EL Sec. 26-44N-7E	929'	Woodstock
MC 12	Sec. 26-43N-6E 635'E and 400'S of intersection of Seemann and Church Rds.	895'	Huntley
MC 13	2900'SL, 115'WL Sec. 7-46N-9E	929'	Fox Lake
NORTHEASTERN ILLINOIS PLANNING COMMISSION BORINGS			
NIPC 1	17'N, 2800'W of SE\c Sec. 7-46N-5E	975'	Capron
NIPC 2	2500'N, 2500'W of SE\c Sec. 8-46N-6E	1160'	Harvard

Well No.	Location	Estimated topo map elevation	Quadrangle
NIPC 3	100'W, 900'N of SE\c Sec. 12-43N-5E	902'	Marengo South
NIPC 3	28'W, 1250'S of NE\c Sec. 17-43N-8E	895'	Crystal Lake
NIPC 5	22'W, 2850'S of NE\c Sec. 30-43N-8E	910'	Crystal Lake
NIPC 6	2500'E, 2100'N of SW\c Sec. 29-44N-6E	910'	Marengo North
NIPC 8	18'N, 1800'W of SE\c Sec. 29-45N-7E	885'	Woodstock
NIPC 8	12'S, 1850'E of NW\c Sec. 15-45N-6E	910'	Harvard
NIPC 9	18'W, 2340'N of SE\c Sec. 33-46N-7E	875'	Hebron
NIPC 10	1300'W, 2200'S of NE\c Sec. 36-43N-5E	885'	Marengo South
NIPC 11	1150'E, 500'N of SW\c Sec. 32-45N-9E	895'	Wauconda
McCUE ROAD LANDFILL (proposed)			
B 19	300'NL, 2500'EL Sec. 35-44N-6E	844'	Marengo North
B 17	600'NL, 1150'EL Sec. 35-44N-6E	895'	Woodstock
B 15	1900'NL, 1450'EL Sec. 35-44N-6E	851'	Huntley
B 13	2000'NL, 2600'EL Sec. 35-44N-6E	854'	Marengo South
PYOTT ROAD LANDFILL (proposed)			
B 1	1800'SL, 2450'EL Sec. 21-43N-8E	842'	Crystal Lake
B 7	1380'SL, 1100'EL Sec. 21-43N-8E	850'	Crystal Lake
G 107	1200'SL, 950'EL Sec. 21-43N-8E	819'	Crystal Lake

Well No.	Location	Estimated topo map elevation	Quadrangle
B 9	250'NL, 1800'EL Sec. 28-43N-8E	851'	Crystal Lake
G 104	280'NL, 2450'EL Sec. 28-43N-8E	858'	Crystal Lake
B 13	2100'NL, 2600'EL Sec. 28-43N-8E	785'	Crystal Lake
DAVIS ROAD LANDFILL (proposed)			
LW 3	1800'NL, 2550'WL Sec. 17-44N-7E	920'	Woodstock
VEUGLER LANDFILL (proposed)			
MW 24	2600'EL, 1300'NL Sec. 16-43N-7E	891'	Huntley
MW 23	1350'EL, 1650'NL Sec. 16-43N-7E	858'	Huntley
MW 27	1875'NL, 850'EL Sec. 16-43N-7E	858'	Huntley
B 11	2150'NL, 650'EL Sec. 16-43N-7E	858'	Huntley
HARTLAND TOWNSHIP LANDFILL (proposed)			
NW 2	2100'SL, 2100'EL Sec. 30-45N-6E	940'	Marengo North
NE 2	2100'SL, 500'EL Sec. 30-45N-6E	902'	Marengo North
SE 4	500'EL, 500'SL Sec. 30-45N-6E	920'	Marengo North
SW 3	2100'EL, 500'SL Sec. 30-45N-6E	935'	Marengo North
ROUTE 47/176 LANDFILL (proposed)			
W-1	2090'SL, 1150'EL Sec. 29-44N-7E	902'	Woodstock
W-2	2080'SL, 330'EL Sec. 29-44N-7E	917'	Woodstock
W-5	225'SL, 1160'EL Sec. 29-44N-7E	908'	Woodstock

Well No.	Location	Estimated topo map elevation	Quadrangle
W-6	420'SL, 90'EL Sec. 29-44N-7E	906'	Woodstock
E-4	2570'SL, 340'WL Sec. 28-44N-7E	919'	Woodstock
E-2	2610'WL, 970'WL Sec. 28-44N-7E	912'	Woodstock
E-3	2620'SL, 1645'WL Sec. 28-44N-7E	914'	Woodstock
E-4	2500'SL, 2305'WL Sec. 28-44N-7E	912'	Woodstock
E-18	450'SL, 300'WL Sec. 28-44N-7E	899'	Woodstock
E-18	50'SL, 1050'WL Sec. 28-44N-7E	901'	Woodstock
E-19	50'SL, 1050'WL Sec. 28-44N-7E	901'	Woodstock
E-20	50'SL, 2310'WL Sec. 28-44N-7E	898'	Woodstock

Table 2. Descriptive statistics on the physical characteristics of lithostratigraphic units in McHenry County, Illinois. Unit abbreviations are shown in Figure 2. Other abbreviations are explained in the key for Appendix B.

Unit (no. observations)

	<2 mm fraction %				Clay mineral content of < 2 μ m (%)							Blow Cnts	Moist. cont
	GR	SD	ST	CL	EXP	ILL	K+C	CAL	DOL	DI	VI		
H(74)	30.9	63.9	11.8	2.5	28.1	50.3	19.2	27.1	72.0	2.3	3.2	52.7	
Mean													
Std dev	26.2	25.4	11.1	2.6	25.2	17.7	10.0	14.0	25.1	0.9	12.2	47.8	
Max	85.6	98.1	40	8	69	65	30	65	139	4	35	200	
Min	0	12	0.6	0	6	20	0	0	27	1.2	-8	7	
Count	38	38	38	13	8	8	9	21	22	18	15	59	
Ec(8)	0.2	15.1	55.6	29.3	35.3	44.0	20.6	17.9	30.5	1.4	16.1	17	17.1
Mean													
Std dev	0.4	8.9	10.3	11.0	20.9	15.3	6.0	10.5	19.7	0.2	8.2		
Max	1.3	31.4	77	46.3	82	58	27	35	68	1.7	35	17	17.1
Min	0	4.55	41.1	15	17	11	7	0	0	1.1	10	17	17.1
Count	8	8	8	8	8	8	8	8	8	8	7	1	1
Wh(25)	11.2	45.2	37.3	17.5	18.5	63.8	17.8	38.1	69.7	3.5	10.5	35.0	10.3
Mean													
Std dev	6.8	9.5	3.5	8.9	6.0	7.8	4.8	22.4	26.3	3.9	7.4	14.8	2.6
Max	30.4	58	42	39.0	38	77	27	90	105	21	30	70	16.2
Min	0.8	20.3	31	6	10	46	9	0	0	1.4	-2	16	5.6
Count	20	20	20	20	23	23	23	22	23	23	15	16	12

Table 2 (cont.). Descriptive statistics on the physical characteristics of lithostratigraphic units in McHenry County, Illinois. Unit abbreviations are shown in Figure 2. Other abbreviations are explained in the key for Appendix B.

Unit (no. observations)	<2 mm fraction %					Clay mineral content of < 2 μ m (%)					Blow Moist.	
	GR	SD	ST	CL	EXP	ILL	K+C	CAL	DOL	DI	VI	Cnts cont
Wa(48)	22.1	80.9	16.1	3.0	18.5	59.8	21.7	51.8	77.0	1.9	9.0	105.5
Mean	23.3	22.5	16.6	7.6	4.6	6.6	3.1	15.2	14.1	0.4	5.0	56.1
Std dev	78.8	98.0	74.2	37	27	71	28	91	102	2.7	21.5	201
Max	0	4.3	2.0	0	9	45	16.5	30	58	1.1	1.5	48
Min	40	40	40	40	13	13	13	13	13	13	10	10
Count												
Pe(10)	36.1	82.0	14.0	4.0								
Mean	31.2	20.3	13.4	7.4								
Std dev	85.2	96.4	46.0	21.0								
Max	0.9	33.0	3.6									
Min	8	8	8	8								
Count												
Pearl Formation, weathered (Bt horizon of Sangamon Geosol; 7 samples)	6.1	61.3	16.6	22.0	22.2	52.8	25.0	15.2	14.3	1.5	17.3	
Mean	3.6	14.7	5.9	15.5	3.2	7.5	5.9	23.7	21.2	0.5	5.7	
Std dev	10.1	89.6	27.3	48.6	27	62	37	63	54	2.1	2.5	
Max	1.7	39.5	10.3	0	18	38	20	0	0	0.7	9	
Min	7	7	7	7	6	6	6	6	6	6	6	
Count												
WIa(25)	9.2	43.1	37.6	18.9	16.8	64.1	19.1	50.3	78.6	2.3	2.0	94.2
Mean	9.6	13.9	9.8	9.1	14.0	11.0	4.4	14.6	22.8	0.4	13.4	60.6
Std dev	32	69	68	37	57	74	24	74	115	3.1	36	200
Max	0	9	24	1	4.5	32	11	9	0	1.8	-15	5
Min	22	22	22	22	20	19	19	19	19	19	19	9
Count												

Table 2 (cont.). Descriptive statistics on the physical characteristics of lithostratigraphic units in McHenry County, Illinois. Unit abbreviations are shown in Figure 2. Other abbreviations are explained in the key for Appendix B.

Unit (no. observations)	<2 mm fraction %					Clay mineral content of < 2 μ m (%)						Blow	Moist.
	GR	SD	ST	CL	EXP	ILL	K+C	CAL	DOL	DI	VI	Cnts	cont
Gf(21)	14.3	43.4	33.9	22.7	10.9	68.9	20.1	54.5	103.8	2.3	-3.0	125.8	9.8
Mean	10.7	10.9	8.4	7.6	2.3	3.4	3.1	13.4	39.5	0.4	3.4	55.1	
Std dev	45	53.2	51	46.2	16	77	27	85	213	3.4	3	200	9.8
Max	2.6	5.3	21.3	14	7	63	15	32	35	1.7	-10	30	9.8
Min	19	19	19	19	19	19	19	19	19	19	19	5	1
Count													

Gk(9)	12.2	38.2	29.1	32.8	32.5	47.6	19.9	42.6	49.6	1.6	17.0		
Mean	7.4	6.6	5.9	6.9	10.0	9.8	2.0	18.9	26.1	0.3	9.2		
Std dev	24.7	51.4	38.5	41.8	49	60	23	60	79	2.1	31		
Max	1.8	27.7	21.3	22.8	20	34	17	0	0	1.1	5		
Min	7	7	7	7	8	8	8	8	8	8	8		
Count													

Appendix A

Detailed descriptions of MC-series cores

Boring MC-1, McHenry County Groundwater Protection

Location: Johnson Farm, 550' WL and 450' NL, Section 30, T46N, R5E, Capron 7 1/2' quad.

Elevation: 893 ft (272 m)

Measurements in feet; colors are on moist sediment.

Stratigraphic summary

0.0-1.0	Fill
1.00-17.25	Intercalated beds of peat, organic-rich silty clay, and thin beds of sand of the Grayslake Peat.
17.25-31.4	Uniform and laminated, fossiliferous silty clay of the Carmi Member of the Equality Formation.
31.4-33.9	Well-sorted fine- to medium-grained sand of the Henry Formation.

Detailed description:

0.0-1.0	Road gravel.
1.0-6.0	Very dark grayish brown (10YR 3/2) fibric peat, quickly oxidizing to black (10YR 2/1); leached.
6.0-6.2	Light brownish gray (10YR 5/2) well sorted, medium-grained sand with few wood fragments; slowly calcareous.
6.2-8.7	No recovery, but some gray sand noted in drive shoe.
8.70-9.25	Very dark grayish brown (10YR 3/2), well-sorted medium-grained sand; few wood fragments; vaguely stratified; calcareous.
9.25-10.85	Black (10YR 2/1) to very dark grayish brown (10YR 3/2) fibric peat; stratified; calcareous.
10.85-11.30	Dark gray (5Y 4/1), moderately well-sorted, fine- to medium-grained sand; calcareous.
11.3-11.7	Dark gray (5Y 4/1) very poorly-sorted gravelly sand; one clast measures 3.0 x 2.0 x 0.8 cm; calcareous.
11.7-13.6	Core loss - probably coarse sand and gravel judging from resistance to augering.
13.60-13.85	Ibid - gradational contact with underlying peat.
13.85-17.25	Very dark gray (10YR 3/1) to black (10YR 2/1) fossiliferous sapric peat.
17.25-19.00	Core loss.
19.00-19.12	Very dark gray (10YR 3/1) or dark gray (10YR 4/1) silty clay with abundant molluscs; contorted, abrupt boundaries between color domains; calcareous; abrupt, wavy lower boundary.
19.12-19.22	Black (10YR 2/1) hemic peat; leached.
19.22-19.59	Ibid., but disturbed by krotovina filled with leached, black hemic clay as above.
19.59-19.72	Dark gray (10YR 4/1) fossiliferous silty clay; uniform; abrupt, smooth lower boundary.
19.72-19.75	Very pale brown (10YR 7/3) well-sorted very fine-grained sand; abrupt boundaries.
19.75-21.30	Dark grayish brown (10YR 4/2) silty clay; vague laminations imparted by slight changes in color; calcareous; fossiliferous; lower part is disturbed.
21.30-23.90	Core loss.
23.9-28.0	Gray (N3.5/0) silty clay, sparsely fossiliferous; uniform; calcareous; grayish brown (2.5Y 5/2) when oxidized.
28.0-29.9	Core loss.
29.9-31.2	Pale brown (10YR 5/2) and light brownish gray (10YR 6/2)

- rhythmites; disturbed bedding; calcareous; few wood fragments.
- 31.2-31.4 As above with thin beds of well-sorted, medium-grained sand; calcareous.
- 31.4-33.9 Core loss; sand heaved up auger; abandoned hole.
-

Boring MC-2, McHenry County Groundwater Protection

Location: McHenry County Conservation Property (Beck Woods), 1250' EL and 725' NL, Section 5, T45N, R5E, Capron 7 1/2' quad.

Elevation: 895 ft (273 m)

Measurements in feet; colors are on moist sediment.

Stratigraphic summary

- 0.0-3.1 Modern soil developed in Peoria Silt.
- 3.1-6.4 Modern soil developed in Tiskilwa Till Member of the Wedron Formation.*
- 6.4-28.6 Very poorly sorted sand and gravel of the Ashmore Member of the Wedron Formation.

Detailed description:

- 0.0-0.7 Very dark grayish brown (10YR 3/2) silt loam, crude, platy structure. A horizon developed in Peoria silt.
- 0.7-3.1 Dark yellowish brown (10YR 4/4) silty clay loam; fine to medium subangular blocky structure; thin discontinuous argillans; leached.
- 3.1-3.3 Brown (7.5YR 5/4) loam diamicton, sticky, leached.
- 3.3-6.4 Dark yellowish brown (10YR 4/6) sandy loam diamicton; maximum gravel size 0.2 x 0.1 x 0.1 ft; matrix is sand; very poorly sorted; uniform.
- 6.4-28.4 Very coarse gravel and sand; difficult drilling.

* the basis for assigning this unit to the Tiskilwa Till Member is the radiocarbon data discussed in MC-3.

Boring MC-3, McHenry County Groundwater Protection

Location: Johansen Property, 2425' EL and 50' SL, Section 22, T46N, R5E, Capron 7 1/2' quad.

Elevation: 907 ft (277 m)

Measurements in feet; colors are on moist sediment.

Stratigraphic summary

- 0.0-0.7 Fill
- 0.7-3.8 Modern soil developed in Peoria Silt.
- 3.8-19.9 Sandy loam diamicton of the Tiskilwa Till Member of the Wedron Formation. Organic matter is common in the lower foot.
- 19.90-20.25 Fossiliferous, laminated silt of the Ashmore Member.
- 20.25-32.00 Interbeds of well-sorted medium-grained sand, poorly sorted sand and gravel, uniform silts, and sandy loam diamicton of the Ashmore Member of the Wedron Formation.

Detailed description:

- 0.0-0.7 Fill; road cinders; top soil.
- 0.7-1.1 Very dark greyish brown (10YR 3/2) silty clay loam; abundant biopores and roots; leached; clear boundary.
- 1.1-2.7 Yellowish brown (10YR 5/4), mottled silty clay loam;

	gradual, irregular boundary; leached.
2.7-3.2	Vaguely stratified silty loam or silty clay loam.
3.2-3.8	Light olive brown (2.5Y 5/4) silty clay loam; leached.
3.8-5.2	Strong brown (7.5Y 5/6) loam diamicton; mottled; soft, leached.
5.2-8.75	Yellowish brown (10YR 5/6) loam diamicton with brown (7.5YR 5/4) mottles that decrease with depth; leached to 6.3 ft.
8.75-15.7	Brown (7.5YR 5/4) loam diamicton with few yellowish brown (10YR 5/6) mottles; calcareous.
15.7-18.8	Dark grayish brown (10YR 4/2) to gray (5Y 4/1) sandy loam diamicton, gradually becoming silty clay loam with depth; stratified from 16.5-18.8 ft.
18.8-19.0	Gray (5Y 4/1) sandy loam diamicton; calcareous.
19.0-20.35	Gray (5Y 4/1) fossiliferous (wood and moss fragments) silt loam; calcareous; vaguely stratified.
20.35-20.50	Disturbed zone.
20.5-21.4	Very poorly sorted sand and gravel.
21.4-22.5	Disturbed zone.
22.50-22.55	Moderately well-sorted fine- to medium-grained sand.
22.55-23.00	Brown (7.5YR 5/2) silt loam; no fossils as noted above; calcareous; refusal at 23.0 ft.
23.0-24.0	Coarsening downwards sand and gravel with moderately well-sorted coarse gravel at base.
24.0-29.0	No sample.
29.0-29.5	Grayish brown (10YR 5/2) moderately well-sorted sand.
29.5-29.8	Grayish brown (10YR 5/2) poorly-sorted medium- to coarse-grained sand.
29.8-30.0	Grayish brown (10YR 5/2) very poorly sorted sand loam diamicton, gravel 1 cm across; muddy.
30.0-30.7	Grayish brown (10YR to 7.5YR 5/2) silt loam; uniform.
30.7-31.0	Brown (10YR 5/3) very fine-grained sand; cross bedded; calcareous.
31.0-31.7	Grayish brown (10YR 5/2) silt loam; uniform; calcareous.
31.7-31.8	Very poorly sorted sand and gravel.
31.8-32.0	Grayish brown (10YR 5/2) sandy loam diamicton; uniform; calcareous.
* fossiliferous sediment from a depth of 18.8 to 23.0 ft yielded a radiocarbon age of 37,910 ± 660 yr B.P. (Beta-65521; EAMS-9006), and is the basis for assigning these sediments to the late Wisconsinan.	

Boring MC-4, McHenry County Groundwater Protection

Location: Bornhoff Farm, 425' EL and 700' NL, Section 27, T45N, R7E, Woodstock 7 1/2' quad.

Elevation: 910 ft (277 m)

Measurements in feet; colors are on moist sediment.

Stratigraphic summary

0.0-4.0	The modern soil developed in stratified sand, diamicton and silt of the Peyton Colluvium.
4.0-9.0	Stratified loam and silt loam diamicton of the Haegar Till Member of the Wedron Formation.
9.0-54.0	Very poorly sorted sand and gravel of the Haegar Till Member.
54.0-61.5	Pinkish gray loam diamicton of an unnamed member of the Wedron Formation, or the Tiskilwa Till Member of the Wedron Formation.

Detailed description:

0.0-1.2	Very dark grayish brown (10YR 3/2) silt loam to clay loam; abundant roots; medium subangular blocky structure; leached.
1.2-1.6	Dark yellowish brown (10YR 4/4 to 4/6) loam diamicton; leached.
1.6-3.6	Yellowish brown (10YR 5/4) moderately well-sorted medium-grained sand; few gravel; leached.
3.6-4.0	Yellowish brown (10YR 5/6) silt loam; vaguely stratified; leached; few biopores; few grayish (10YR 6/1) calcareous layers; abrupt boundaries between gray calcareous and yellowish brown leached layers.
4.0-9.0	Yellow (10YR 7/6) loam and silt loam diamicton with dark yellowish brown (10YR 3/4) sesquioxide stains on peds; weak medium subangular blocky structure; abrupt, wavy boundaries between loamy and silty diamicton; calcareous; lower 2.0 disturbed, but appears to be primarily loam diamicton.
9.0-54.0	Yellowish brown (10YR 5/6) to light yellowish brown (10YR 6/4) very poorly sorted sand and gravel; maximum clast dimension 0.18 x 0.12 x 0.08 ft; calcareous; 1.0 ft long samples retrieved at 23.7-24.7 ft, 44.0-45.0 ft.
54.0-61.5	Pinkish gray loam diamicton; sample not recovered.

Boring MC-5, McHenry County Groundwater Protection

Location: Thornton Turf Nursery, 500' WL and 2400' NL, Section 5, T44N, R8E, McHenry 7 1/2' quad.

Elevation: 798 ft (243 m)

Measurements in feet; colors are on moist sediment.

Stratigraphic summary

0.0-1.9	Fill.
1.9-2.2	Grayslake Peat.
2.2-4.7	Stratified beds of organic silty clay and sand of the Cahokia Alluvium.
4.7-44.0	Poorly sorted sand and gravel of the Henry Formation.

Detailed description:

0.0-1.9	Fill; gravelly peat.
1.9-2.2	Black (10YR 2/1) sapric peat; uniform; leached.
2.2-3.2	Dark grayish brown (10YR 4/2) silty clay loam diamicton with abundant moss and wood fragments.
3.2-3.5	Gray (5Y 5/1) gravel with fine-grained sand.
3.5-4.7	Gray (5Y 5/1) medium to coarse-grained sand with one 0.4 ft thick gray silty clay diamicton bed with plant fragments.
4.7-44.0	Varicolored sand and gravel; calcareous; stratified; not sampled; color of cuttings coming off auger flights include light olive brown (2.5Y 5/4; 19-24 ft) and brown (10YR 5/3; 24-44 ft).

Boring MC-7, McHenry County Groundwater Protection

Location: McHenry County Conservation District Property, 1000' NL, 750' WL, Section 29, T46N, R8E, Richmond 7 1/2' quad.

Elevation: 795 ft (242 m)

Measurements in feet; colors are on moist sediment.

Stratigraphic summary

0.0-2.1	Modern Soil developed in thin Richland Loess and Henry Formation
2.1-8.0	Very poorly sorted sand and gravel and thin diamicton layers of the Henry Formation.
8.0-25.0	Dark brown (7.5YR 4.5/2) loam diamicton of the Tiskilwa Till Member of the Wedron Formation
25.0-102.0	Grayish brown (10YR 5/2) gravelly sand of the Ashmore Member of the Wedron Formation; fine grained intervals composed of thin beds of diamicton and silty rhythmites at intervals from 35.5 to 36.5 ft and from 68.0 to 70.5 ft.
102.00-108.85	Grayish brown (10YR 5/2) sandy loam and loam diamicton of the Glasford Formation.
108.85-111.5	Glauconitic dolomite of the Elwood Formation(?)

Artesian conditions were experienced while drilling below the layer of Tiskilwa Till at 25.0 ft. At about 33.0 ft, artesian flow was about 5 gpm and the artesian pressure was 11 ft above ground surface; at 38 ft, flow was estimated to be 30 to 40 gpm. No piezometer was installed at this site.

Detailed description:

0.0-0.7	Black (10YR 2/1) silty clay; soft, medium granular structure; abundant coarse roots; few biopores; leached, abrupt boundary.
0.7-1.1	Very dark gray (5Y 3/1) clay; soft; uniform; leached; abrupt boundary.
1.1-2.1	Light olive gray (5Y 6/1) and dark gray (N 4/0) clay with large, semi-angular crystalline clast at top (5 cm long, 2.5 cm wide and deep) and a large rounded carbonate clast at the bottom (7.0 x 4.5 x 3.0 cm).
2.1-3.0	Core loss.
3.0-4.2	Grayish brown (10YR 5/2) very poorly sorted granular sediment; calcareous at about 2.7ft; abrupt lower boundary.
4.2-4.5	Brown (7.5YR 5/2) sandy loam diamicton; calcareous; abrupt lower boundary.
4.5-5.0	Ibid., but somewhat coarser than above.
5.0-5.7	Brown (7.5YR 5/2) loam diamicton; stratification imparted by thin layers and laminae of siltier sediment with higher value than matrix; inclusions of organic matter 1 cm long and 2 cm thick (degraded moss?); calcareous.
5.7-8.0	Core loss; geophysical log indicates a layer of sand and gravel from about 6 to 8 ft.
8.0-10.5	Dark brown (7.5YR 4.5/2) loam diamicton; uniform; calcareous.
10.5-13.0	Core loss. Geophysical log indicates lithology as above.
13.0-25.0	Dark brown (7.5YR 4.5/2) loam diamicton; uniform; calcareous.
25.0-26.2	Grayish brown (10YR 5/2) gravelly sand; uniform.
26.2-28.0	Core loss. Geophysical log indicates lithology as above.
28.0-32.0	Core loss. Geophysical log indicates lithology as above.
32.0-33.0	Rotary drilled. Geophysical log indicates lithology as above.
33.0-35.0	Recovery 1.6/2.0 ft; blow counts 9-18-21-35.
33.0-34.6	Grayish brown (10YR 5/2) gravelly sand; uniform.
34.6-35.0	Core loss.
35.0-43.0	Rotary drilled. Geophysical log indicates lithology as above except for a thin layer of fine-grained material from a depth of 35.5 to 36.5 ft.
43.0-45.0	Recovery 1.0/2.0 ft; blow counts 19-34-41-50.
43.0-44.0	Grayish brown (10YR 5/2) gravelly sand as above.
44.0-45.0	Core loss.
45.0-48.0	Rotary drilled. Geophysical log indicates lithology as above.
48.0-50.0	Recovery 1.5/2.0 ft; blow counts 7-16-25-37.
48.0-49.5	Grayish brown (10YR 5/2) gravelly sand as above.
49.5-50.0	Core loss.
50.0-58.0	Rotary drilled. Geophysical log indicates lithology as above.
58.0-59.5	Recovery 1.5/1.5 ft; blow counts 37-79-83-100/5".
58.0-59.5	Grayish brown (10YR 5/2) gravelly sand as above.
59.5-68.0	Rotary drilled. Geophysical log indicates a change from sand and gravel to finer material at about 68.0 ft.
68.0-70.0	Recovery 1.3/2.0 ft; blow counts 25-59-63-79.
68.0-68.3	Grayish brown (10YR 4.5/2) loam diamicton; calcareous; abrupt lower boundary.
68.3-69.3	Grayish brown (10YR 4.5/2) very fine sand and silt loam rhythmite; calcareous.
69.3-70.0	Core loss. Geophysical log indicates a change back to sand and gravel at about 70.5 ft.
70.0-78.0	Rotary drilled. Geophysical log indicates sand and gravel lithology.
78.0-80.0	Recovery 1.3/2.0 ft; blow counts 14-45-83-90.

78.0-79.3	Grayish brown (10YR 5/2) fine- to medium-grained sand with few fine to medium gravel; uniform.
79.3-80.0	Core loss.
80.0-88.0	Rotary drilled. Geophysical log indicates a change from sand and gravel to finer material at about 87.0 ft.
88.0-90.0	Recovery 1.5/2.0 ft; blow counts 39-45-75-97.
88.0-88.1	Grayish brown (10YR 4.5/2) silt loam diamicton; crudely stratified; calcareous.
88.1-88.2	Grayish brown (10YR 4.5/2) silt and very fine-grained sand; laminated; calcareous.
88.2-89.5	Grayish brown (10YR 4.5/2) fine- to medium-grained sand with few fine to medium gravel; uniform.
89.5-90.0	Core loss. Geophysical log indicates a change back to sand and gravel.
90.0-98.0	Rotary drilled. Geophysical log indicates sand and gravel lithology as above.
98.0-100.0	Recovery 1.0/2.0 ft; blow counts 24-40-63-58.
98.0-99.0	Grayish brown (10YR 4.5/2) fine- to medium-grained sand with few fine to medium gravel as above.
99.0-100.0	Core loss.
100.0-103.0	Rotary drilled. Geophysical log indicates a lithologic change at about 102.0 ft.
103.0-105.0	Recovery 1.8/2.0 ft; blow counts 24-40-63-58.
103.0-104.3	Grayish brown (10YR 5/2) loam diamicton; tends to break along crude planar structures; calcareous.
104.30-104.55	Grayish brown (10YR 5/2) sandy loam diamicton; uniform; calcareous.
104.55- 104.8	Ibid.
105.0-108.0	Rotary drilled. Geophysical log indicates lithology as above.
108.0-110.0	Recovery 1.3/1.8; blow counts 90-70-72-100/3".
108.0-108.5	Large piece of broken dolomite.
108.5-108.7	Medium-grained sand with few gravel.
108.70-108.85	Sandy loam diamicton.
108.85-109.3	Weathered bedrock.
109.3-109.8	Core loss.
109.8-111.0	Rotary drilled. Geophysical log indicates lithology as above.
111.0-112.0	Bedrock cored; 0.5-1.0 recovery.
111.0-111.5	Light gray (5Y 7/2) dolomite with abundant flakes of pale green (5G 6/2) shale (glauconite?).

Boring MC-8, McHenry County Groundwater Protection

Location: Joosten Farm, 175' NL, 146' EL, Section 6, T46N, R7E, Hebron 7 1/2' quad.

Elevation: 945 ft (288 m)

Measurements in feet; colors are on moist sediment.

Stratigraphic summary*

0.0-2.1	Fill
2.1-23.0	C1 horizon of the modern soil developed in the Tiskilwa Till Member of the Wedron Formation (perhaps the Haegar, but no lithologic break within the diamicton sequence to the top of the underlying paleosol; according to Johnson (1983), the Haegar is thin or missing in this area although it is mapped as the surficial unit by Lineback (1979).
23.0-46.1	Unweathered Tiskilwa Till Member.
46.10-46.13	Calcareous, wood-bearing Morton Silt

46.13-47.00	Morton Silt
46.10-46.13	A/Ob1 horizon developed in Morton Silt.
46.13-47.00	Alb1 horizon developed in Morton Silt.
47.00-49.37	Robein Silt
47.00-47.12	A/Ob2 horizon of the Farmdale Geosol developed in Robein Silt.
47.12-49.01	Alb2 horizon of the Farmdale Geosol developed in Robein Silt.
49.01-49.37	C1b2 horizon of the Farmdale Geosol developed in Robein Silt.
49.37-65.5	Sangamon Geosol developed in Pearl Formation.
49.37-50.3	A1 horizon of the Sangamon Geosol developed in the Pearl Formation.
50.3-52.92	B2tr horizon of the Sangamon Geosol developed in the Pearl Formation.
52.92-55.0	B3tg horizon of the Sangamon Geosol developed in the Pearl Formation.
55.0-61.71	C1g horizon of the Sangamon Geosol developed in the Pearl Formation.
61.71-65.5	C3 horizon of the Sangamon Geosol developed in a sandy loam diamicton facies of the Pearl Formation.
65.5-116.0	Stratified sand and gravel of the Pearl Formation.
116.0-128.0	Laminated brown silt and silty clay rhythmites of the Teneriffe Silt.
128.0-136.0	Interbeds of sandy loam diamicton, sand and gravel and laminated silty clay and silt of the Teneriffe Silt.
136.0-186.0	Brown loam till of the Oregon Till Member of the Glasford Formation; sand and gravel layer from 156.0-163.0 ft.
186.0-196.0	Bt and Bt/R horizon of the Yarmouth Geosol developed in Lierle Clay of the Banner Formation.
196.0-218.0	Cherty dolomite of the Elwood Formation; upper 10 ft is oxidized and broken.

* Three radiocarbon ages and a ^{10}Be inventory were obtained from the buried loess and soil succession in MC-8 (Curry and Pavich, 1994); the ages include 24,780 \pm 360 yr B.P. (ISGS-2601), 26,030 \pm 450 yr B.P. (ISGS-2602) and 38,500 \pm 5000 yr B.P. (CAMS-7591; WW-172).

Detailed description:

0.0-1.0	Very dark gray gravelly loam; fill.
1.0-1.5	Yellowish brown (10YR 5/4) sandy loam diamicton; dolomitic.
1.5-1.8	Light yellowish brown (10YR 6/4) silt loam; uniform; abrupt upper and lower boundaries; calcareous.
1.8-2.1	Ibid.
2.1-23.0	Brown (7.5YR 4.5/4) clay loam diamicton with strong brown (7.5YR 5/8) stains on widely spaced discontinuities; uniform; hard; calcareous.
23.0-43.0	Brown (7.5YR 5/2) clay loam diamicton; hard; calcareous; uniform.
43.0-45.4	Grayish brown (10YR 4.5/2) clay loam diamicton; hard; calcareous; disturbed at top.
45.4-45.5	Pale brown (10YR 5/3) silt loam; somewhat friable; uniform; calcareous; abrupt, smooth boundaries.
45.5-46.0	Gray (10YR 5/1) loam diamicton; hard; uniform; oxidizing to brown (10YR 4/3); calcareous.
46.0-46.1	Dolomite cobble with dark reddish brown (2.5YR 3.4) patina; wavy, abrupt boundaries.
46.1-46.13	Light gray (2.5Y 7.5/2) silt loam with common inclusions of black (10YR 2/1) wood fragments and degraded organic matter; laminated; calcareous; wavy, abrupt lower contact; sacrificed for C-14 age; yielded age of 24,780 \pm 360 yr B.P.

- (ISGS-2601). [AO/A1b horizon developed in Morton Silt].
- 46.13-46.27 Light gray (2.5Y 7/2) silt loam with abundant inclusions and laminae of black (10YR 2/1) silt loam; friable; weak, platy structure imparted by continuous silans; leached; wavy, clear lower boundary; few vertical discontinuities filled with brown (10YR 4/2) silt loam [A12b horizon developed in Morton Silt].
- 46.27-46.55 Dark grayish brown (10YR 4/2) silt loam; friable; few biopores; disturbed silans; uncommon small blebs of degraded organic matter; clear, irregular boundary; few vertical discontinuities filled with brown (10YR 4/2) silt loam [A13b horizon developed in Morton Silt].
- 46.55-47.00 to 47.12 As above, but somewhat darker (dark gray, 10YR 4/1); irregular, abrupt lower contact.
- 47.00 to 47.12-47.32 Very dark gray (10YR 3/1) silt loam with abundant small inclusions of black (10YR 2/1), degraded organic matter; friable; leached; weak platy structure imparted by continuous silans [AOb2 horizon of Farmdale Geosol developed in Robein Silt].
- 47.32-48.02 Dark gray (10YR 4/1) silt loam with fewer inclusions of organic matter; structures similar to above [A1 horizon of Farmdale Geosol developed in Robein Silt].
- 48.02-49.01 Very dark gray (10YR 3/1) and grayish brown (10YR 5.2) silty clay loam; somewhat friable; moderate platy structure imparted by continuous silans; uncommon, small blebs of degraded organic matter; leached; becoming sandier and stratified with depth; clear, smooth lower boundary [IIA2 horizon of Farmdale Geosol developed in Robein Silt].
- 49.01-49.37 Dark grayish brown (10YR 4/2) sandy loam; somewhat friable; deformed (partly liquified) during sampling; stratification imparted by laminae of light brownish gray (10YR 6/2) loam; leached; abrupt, smooth lower boundary [IIC1 horizon of Farmdale Geosol developed in Roxana Silt].
- 49.37-50.3 Very similar to above, but somewhat browner (10YR 3.5/2), and not as sandy; rare, small blebs of degraded organic matter; uncommon biopores; leached; vaguely stratified; gradual lower boundary [A horizon of the Sangamon Geosol developed in Pearl Formation].
- 50.3-50.5 transition zone
- 50.5-52.92 Very dark gray (10YR 3/1) clay loam diamicton, quickly oxidizing to reddish brown (5YR 4/4) and brown (7.5YR 4/4); thick, continuous argillans; abundant "ghosts" of pebbles; leached, firm, clear lower boundary [IIB21tr horizon of the Sangamon Geosol developed in Pearl Formation].
- 52.92-55.00 As above, but less clay; friable to firm; stratified, including a layer of clayey sediment from 54.0 to 54.1 ft; leached; thin, discontinuous argillans; fewer pebbles and cobbles, and fewer "ghosts" than above; gradual lower boundary [IIB22t horizon of the Sangamon Geosol developed in Pearl Formation].
- 55.0-55.67 Transition zone.
- 55.67-61.71 Moderately poorly sorted to well-sorted light gray (N 6/0) sand; quickly oxidizing to strong brown (7.5YR 5/8); friable; stratified; slowly calcareous at 55.8 ft [IIC1g horizon of the Sangamon Geosol developed in Pearl Formation].
- 61.71-62.0 Gray (5Y 5/1) sandy loam to clay loam diamicton, quickly oxidizing brown (10YR 5/3); calcareous; vaguely stratified; stratification imparted by contrast in grain-size; lower contact not sampled [IIIC2g horizon of Sangamon Geosol

developed in Pearl Formation; D horizon material below].
 62.0-63.0 Changed to rotary drilling; cased hole to 63.0 ft.
 63.0-63.5 Recovery 1.5/2.0 ft. Blow counts 22-33-35-47. Lithology as above
 63.5-68.0 Rotary drilled; geophysical log indicates lithologic change at 65.5 ft.
 68.0-70.0 Recovery 1.0/2.0 ft. Blow counts 22-18-17-18.
 68.0-68.6 Yellowish brown (10YR 5/6) poorly sorted gravelly sand; calcareous; uniform.
 68.80-68.85 Moderately well-sorted, very fine-grained sand.
 68.85-69.0 Ibid.
 69.0-70.0 Core loss
 70.0-73.0 Rotary drilled; geophysical log indicates lithology as above.
 73.0-75.0 Recovery 1.0/2.0 ft. Blow counts 35-45-59-18.
 73.0-74.0 Yellowish brown (10YR 5/6) gravelly sand; disturbed; contains abundant shattered flaggy fragments of dolomite; sample contains abundant drilling mud.
 74.0-75.0 Core loss.
 75.0-78.0 Rotary drilled. Geophysical log indicates lithology as above.
 78.0-80.0 Recovery 1.5/2.0 ft. Blow counts 17-39-36-34.
 78.0-78.3 Well sorted medium gravel
 78.3-79.5 Moderately well sorted, medium grained sand with small to large gravel that become more abundant with depth.
 79.5-80.0 Core loss.
 80.0-83.0 Rotary drilled; geophysical log indicates lithology as above.
 83.0-85.0 Recovery 1.2/2.0 ft. Blow counts 32-36-34-31.
 83.0-84.2 Dark yellowish brown (10YR 4/4) very poorly sorted sand and gravel; uniform; calcareous.
 84.2-85.0 Core loss.
 85.0-93.0 Rotary drilled; geophysical log indicates lithology as above.
 93.0-95.0 Recovery 1.0/2.0 ft. Blow counts 44-29-36-43.
 93.0-94.0 As above.
 94.0-95.0 Core loss.
 95.0-103.0 Rotary drilled; geophysical log indicates lithology as above.
 103.0-105.0 Recovery 1.6/2.0 ft. Blow counts 29-36-38-43.
 103.0-104.6 As above; stratified.
 104.6-105.0 Core loss.
 105.0-113.0 Rotary drilled; geophysical log indicates lithology as above.
 113.0-115.0 Recovery 1.7/2.0 ft. Blow counts 31-44-76-79.
 113.0-114.7 Brown (10YR 5/3) moderately well-sorted medium-grained sand; vaguely stratified; calcareous.
 114.7-115.0 Core loss.
 115.0-118.0 Rotary drilled. Geophysical log indicates a lithologic change at 116.0 ft.
 118.0-120.0 Recovery 2.0/2.0 ft. Blow counts 14-27-31-69.
 118.0-118.5 Grayish brown (10YR 5/2) silt loam; with few laminae of dark grayish brown (10YR 4/2) silty clay (lithology A).
 118.5-119.2 Grayish brown (10YR 4/2) silty clay; uniform; calcareous (lithology B).
 119.2-120.0 Lithology A.
 120.0-123.0 Rotary drilled; geophysical log indicates lithology as above.
 123.0-125.0 Recovery 2.0/2.0 ft. Blow counts 49-73-43-60.
 123.0-123.1 Lithology A from above.
 123.1-124.1 Very well-sorted fine-grained sand
 124.1-125.0 Lithology B from above.

125.0-128.0 Rotary drilled. Geophysical log indicates a return to coarse-grained sediment at 128 ft.

128.0-130.0 Recovery 1.5/2.0 ft. Blow counts 58-75-90-150.

128.0-128.8 Yellowish brown (10YR 5/4) very poorly-sorted gravelly, silty sand.

128.8-128.9 Silt loam; uniform.

128.9-129.0 Ibid.

129.0-129.5 Yellowish brown (10YR 5/4) sandy loam diamicton.

129.5-130.0 Core loss.

130.0-133.0 Rotary drilled. Geophysical log indicates lithology as above.

133.0-135.0 Recovery 1.7/2.0 ft. Blow counts 44-78-81-68.

133.0-133.2 Yellowish brown (10YR 5/4) poorly sorted sand and gravel.

133.2-133.6 Brown (10YR 5/3) silt loam; laminated; calcareous.

133.6-134.7 Ibid.

134.7-135.0 Core loss.

135.0-143.0 Rotary drilled. Geophysical log indicates lithologic change at 136.0 ft.

143.0-145.0 Recovery 2.0/2.0 ft. Blow counts 19-34-62-73.

143.0-145.0 Brown (7.5YR 5/2) loam diamicton; hard; uniform; calcareous.

145.0-148.0 Rotary drilled; geophysical log indicates lithology as above.

148.0-150.0 Recovery 2.2/2.0 ft. Blow counts 29-53-70-98.

148.0-150.0 As above.

150.0-153.0 Rotary drilled; geophysical log indicates lithology as above.

153.0-155.0 Recovery 1.2/2.0 ft. Blow counts 18-50-90-73.

153.0-154.2 As above.

154.2-155.0 Core loss.

155.0-158.0 Rotary drilled. Geophysical log indicates lithologic change at 156.0 ft.

158.0-158.6 Recovery 0.6/0.6 ft. Blow counts 140-100/1".

158.0-158.6 Very poorly sorted sand and gravel.

158.6-163.0 Rotary drilled. Geophysical log indicates a lithologic change at 163.0 ft.

163.0-165.0 Recovery 2.0/2.0 ft. Blow counts 18-32-40-78.

163.0-165.0 Brown (7.5YR 5/2) loam diamicton; hard; uniform; calcareous.

165.0-168.0 Rotary drilled; geophysical log indicates lithology as above.

168.0-169.6 Recovery 1.6/1.6 ft. Blow counts 14-40-115-100/1".

168.0-169.6 As above.

169.6-178.0 Rotary drilled; geophysical log indicates lithology as above.

178.0-178.3 Recovery 0.3/0.3 ft. Blow counts 250/4".

178.0-178.3 As above.

178.3-188.0 Rotary drilled. Driller notes harder drilling at 187.5 ft, and geophysical log indicates lithologic change at 186.0.

188.0-190.0 Recovery 2.0/2.0 ft. Blow counts 22-31-90-130.

188.0-188.3 Very dark grayish brown (10YR 3/2) loam; leached; few biopores; uncommon sesquioxide replacements of small fragments of organic matter (wood fragments?).

188.3-190.0 Very dark grayish brown (2.5Y 3/2) silty clay loam diamicton; leached; abundant, thick, continuous clay skins with uncommon slickensides.

190-191.1 Recovery 1.1/1.1 ft. Blow counts 24-50-100/1".

190.0-190.7 As above.

190.7-191.7. As above, but with striking white (10YR 9/1) clasts of powdery, leached silt (probably weathered chert); abrupt, irregular boundaries between white, weathered clasts and dark matrix.

191.1-192.0 Rotary drilled.

192.0-192.5 Recovery 0.5/0.5 ft. Blow counts 400/5".

192.0-192.5	As above.
192.5-198.0	Rotary drilled. Geophysical log indicates lithologic change at 196.0 ft.
198.0-198.2	Recovery 0.0/0.2 ft. Blow counts 300/2".
198.0	Begin coring
198.0-208.0	Recovery 7.2/10.0 ft (Core loss includes the interval lost from 198.0-198.2)
198.0-202.6	Thin- to medium-bedded light brownish gray (2.5Y 6/2) to brownish yellow (10YR 6/8) dolomite with olive yellow (2.5Y 6/8) wavy, shaly partings and laminae; abundant white (10YR 8/1) chert nodules (0.05' across) and beds (0.15' thick); poor rock quality (RQD=0).
202.6-205.2	As above, but with better rock quality (RQD≈80%), and with light gray (5Y 7/1) wavy, soft shale partings.
205.2-208.0	Core loss.
208.0-218.0	Recovery 10.0-10.0 ft. Light gray (5Y 6.5/1) dolomite with chert nodules and beds and shale partings as above, except that the shale is greener (dark greenish gray (5G 4/1). One horizontal discontinuity at 214.0 ft with thin filling of botryoidal chalcedony.

Boring MC-9, McHenry County Groundwater Protection

Location: Meyer's Sand and Gravel Pit, 400' NL, 100' EL, Section 29, T45N, R8E, McHenry 7 1/2' quad.

Elevation: 850 ft (259 m)

Measurements in feet; colors are on moist sediment.

Stratigraphic summary

0.0-16.0	Sand and gravel of the Henry Formation.
16.0-29.5	Silty clay diamicton of the Yorkville Till Member of the Wedron Formation.
29.5-44.8	Stratified diamicton with interbeds of sand and gravel of an unnamed member of the Wedron Formation.
44.8-59.8	Laminated silts of the Wedron Formation, ostensibly related to the Tiskilwa Till Member of the Wedron Formation.
59.8-65.9	Sand and gravel of Tiskilwa Till Member.
65.9-188.5	Brown loam diamicton of the Tiskilwa Till Member; interbeds of sand from 112.0-114.0 ft, 121.5-124.0 ft, and 170.5-173.0 ft.
188.5-195.0	Very fine-grained sand of the Ashmore Member of the Wedron Formation.
195.0-196.2	Shaly dolomite of the Kankakee Formation(?).

Detailed description:

0.0-1.3	Yellowish brown (10YR 5/4) poorly sorted sand and gravel, possibly fill; calcareous.
1.3-2.5	Core loss.
2.5-4.5	As above.
4.5-7.5	Core loss.
7.5-9.3	As above.
9.3-12.5	Core loss.
12.5-16.0	Yellowish brown (10YR 5/4) poorly sorted sand and gravel as above.
16.0-16.6	Yellowish brown (10YR 5/4) silty clay loam diamicton, calcareous, with discontinuous reddish yellow (7.5YR 6/8) to strong brown (7.5YR 5/8) stains along horizontally oriented discontinuities; gradual lower boundary; calcareous.
16.6-19.1	Dark grayish brown (2.5Y 4/2) silty clay loam diamicton;

	uniform with few horizontally oriented discontinuities that are stained yellowish brown (10YR 5/4)
19.1-22.5	Core loss.
22.5-27.5	Core loss; geophysical log suggests lithology same as above. Switched to rotary drilling.
27.5-29.5	Recovery 2.0/2.0; blow counts 12-19-22-30.
27.5-29.5	Dark gray (5Y 4/1) silty clay diamicton; uniform; cleaves with rock hammer along preferred horizontal fabric; calcareous.
29.5-30.0	Core loss. Return to continuous coring.
30.0-31.5	Disturbed yellowish brown (10YR 5/6) silty sand and gravel with ribbon of gray silty clay diamicton as above; lower contact is disturbed and upper contact was not sampled.
31.5-34.3	Grayish brown (10YR 5/2) silty clay loam diamicton, soft, calcareous, abundant lenses of somewhat sandier and browner sediment with abrupt contacts (the impression is that the lithology of this interval is composed of silty loam diamicton (somewhat sandier than above) with inclusions of sandier sediment, including weathered bedrock).
34.3-38.6	Grayish brown (10YR 5/2) loam diamicton; uniform (in contrast to above); gradational lower boundary; calcareous.
38.6-39.6	Transition zone
39.6-41.7	Dark grayish brown (10YR 4/2) silty clay loam with contorted whips and laminae of very pale brown (10YR 7/3) silt; contacts between lithologies is abrupt.
41.7-42.5	Core loss.
42.5-44.8	As above, except that light brownish silt occurs as a vertical filling along a branching, web-like discontinuities (clastic dike?).
44.8-47.7	Grayish brown (10YR 5/2) silt loam and dark grayish brown (10YR 4/2) silty clay; laminated; contorted bedding; abrupt lower boundary; small irregular color domains with abrupt contacts; color controlled by grain size; grayish silt makes up about 60% of the layers, and the dark grayish brown silty clay about 40%.
47.7-49.0	Ibid, about 50% dark grayish brown (10YR 4/2) silty clay and 50% very pale brown (10YR 7/3) silt [Lithology A]
49.0-49.7	Light brownish gray (10YR 6/2) silt with uncommon laminae of dark grayish brown (10YR 4/2) silty clay; interval liquified when placed in box [Lithology B]
49.7-50.2	Lithology A
50.2-50.6	Lithology B
50.6-50.9	Lithology A
50.9-51.2	Lithology B
51.2-52.1	Lithology A
52.1-53.1	Lithology B
53.1-53.9	Light gray (10YR 6/2) silty diamicton; stratified; few gravel and grains of very coarse sand; one large rounded clast of dark grayish brown (10YR 4/2) silty clay 0.1' across; largest bedrock clast 0.05' across and composed of carbonate; calcareous.
53.9-54.9	Grayish brown (10YR 5/2) silt, uniform, deformed (liquified during storage)
54.9-56.1	As above but with fine rhythmites; beds are 0.01' thick and change from grayish brown (10YR 5/2) to light grayish brown (10YR 6/2) silt; abrupt lower contact [Lithology C]
56.1-56.3	Dark grayish brown (10YR 4/2) silty clay, calcareous, abrupt contacts [Lithology D]
56.3-56.6	Lithology C
56.6-57.5	Core loss.
57.5-57.8	Lithology C
57.8-58.4	Lithology D

58.4-58.5	Lithology C; abrupt lower boundary.
58.5-59.1	Brown (7.5YR 4/2) loam diamicton; few thin layers of stratified sand, otherwise uniform; clear lower contact [Lithology E]
59.1-59.3	Stratified sandy loam with interbeds of brown (7.5YR 4/2) loam and grayish brown (10YR 5/2) loam; calcareous.
59.3-59.8	Brown (7.5YR 4/2) silt loam with abundant pebbles; interstratified with lithologies D and E from above; calcareous; abrupt contacts.
59.8-65.0	Core loss. Geophysical log indicates a sand and gravel lithology as below.
65.0-65.9	Poorly sorted sand and gravel; disturbed.
65.9-69.6	Brown (7.5YR 4/2) loam diamicton; uniform.
69.6-72.0	Core loss; geophysical log indicates lithology is as above.
72.0-72.5	Brown (7.5YR 4/2) loam diamicton as above.
72.5-75.0	Core loss; geophysical log indicates lithology as above.
75.0-79.2	Brown (7.5YR 4/2) loam diamicton as above.
79.2-80.0	Core loss; geophysical log indicates lithology as above.
80.0-81.6	Brown (7.5YR 4/2) loam diamicton as above.
81.6-82.0	Brown (7.5YR 4/2) well-sorted medium-grained sand; stratified.
82.0-82.5	Brown (7.5YR 4/2) sandy loam diamicton; uniform; abrupt lower boundary.
82.5-87.1	Brown (7.5YR 4/2) loam diamicton; uniform; lenses of pinkish gray (7.5YR 5/2) very fine-grained sand interbeds from 82.80-82.85, 82.40-82.43, and 86.40-86.55 ft.
87.1-87.5	Core loss; geophysical log indicates lithology as above.
87.5-93.0	Rotary drilled; geophysical log indicates lithology as above.
93.0-95.0	Recovery 2.0/2.0 ft; blow counts 32-50-80-140.
93.0-95.0	Brown (7.5YR 4/2) loam diamicton; uniform; hard; calcareous.
95.0-103.0	Rotary drilled; geophysical log indicates lithology as above.
103.0-105.0	Recovery 2.0/2.0 ft; blow counts 18-28-47-81.
103.0-105.0	Brown (7.5YR 4/2) loam diamicton as above.
105.0-113.0	Rotary drilled; geophysical log indicates lithology as above, except for an indication of a sand and gravel lense from 112.0 to 114.0 ft.
113.0-114.5	Recovery 1.5/1.5 ft; blow counts 55-98-145.
113.0-145.0	Brown (7.5YR 4/2) loam diamicton as above.
114.5-123.0	Rotary drilled; geophysical log indicates a lithologic change to sand and gravel at 121.5 ft.
123.0-123.6	Recovery 0.6/0.6 ft; blow counts 200-100/1".
123.0-123.6	Brown (7.5YR 4/2) very poorly-sorted sand and gravel.
123.6-133.0	Rotary drilled; geophysical log indicates a lithologic change back to diamicton at 124.0 ft.
133.0-133.7	Recovery 0.7/1.0 ft; blow counts 115-200/3".
133.0-133.7	Brown (7.5YR 4/2) loam diamicton with few small blebs of light pinkish gray (7.5YR 5/2) fine-grained material (silty loam?); calcareous.
133.7-143.0	Rotary drilled; geophysical log indicates lithology as above.
143.0-144.5	Recovery 1.3/1.5; blow counts 40-90-250.
143.0-144.5	Brown (7.5YR 4/2) loam diamicton; uniform; calcareous.
144.5-153.0	Rotary drilled; geophysical log indicates lithology as above.
153.0-154.5	Recovery 0.5/1.5; blow counts 33-115-220.
153.0-154.5	Brown (7.5YR 4/2) loam diamicton as above.
154.5-163.0	Rotary drilled; geophysical log indicates lithology as above.
163.0-165.0	Recovery 2.0/2.0 ft; blow counts 19-43-52-99.
163.0-165.0	Brown (7.5YR 4/2) loam diamicton as above.

165.0-173.0 Rotary drilled; geophysical log indicates lithology as above, except for a layer of sand and gravel indicated from 170.5-173.0 ft.

173.0-174.0 Recovery 1.0/1.0; blow counts 45-200.

173.0-174.0 Brown (10YR 4/2) silty clay loam diamicton, calcareous with medium subangular blocky structure with yellowish red (5YR 4/6) stains along peds; calcareous.

174.0-183.0 Rotary drilled; geophysical log indicates interval above (buried soil?) persists from 173.0 to 182.5; below 182.5, the lithology appears to be as below.

183.0-184.0 Recovery 1.0/2.0 ft; blow counts 170-135-117-90.

183.0-184.0 Brown (7.5YR 4.5/2) loam diamicton; very hard; calcareous; registers on geophysical log like sand and gravel.

184.0-193.0 Rotary drilled; geophysical log indicates a lithologic change to sand and gravel at 188.5 ft.

193.0-194.2 Recovery 0.8/0.8; blow counts 170-200/3".

193.0-193.2 Pinkish gray (7.5YR 6/2) stratified, very well-sorted very fine-grained sand (climbing ripples?).

193.2-194.2 Disturbed sample of very poorly sorted sand and gravel, largest clast 0.1' across.

194.2-195.0 Rotary drilled; geophysical log suggests sand and gravel lithology, rock at 195.0'

195.0-202.0 Bedrock core; 1.2/7.0 recovery.

195.0-196.2 Light gray (10YR 6/1 and 10YR 7/1) layered dolomite; three, light gray (10YR 6/1) wavy shale laminae near base.

Lost all circulation.

Boring MC-10, McHenry County Groundwater Protection

Location: Kinas Farm, 215' SL, 10' EL, Section 30, T45N, R5E, Garden Prairie 7 1/2' quad.

Elevation: 860 ft (262 m)

Measurements in feet; colors are on moist sediment.

Stratigraphic summary

0.0-≈2.1 Modern soil developed in Peoria Loess.

≈2.1-41.8-76.0 Gray sandy loam diamicton of the Oregon Till Member of the Glasford Formation.

76.0-88.7 Poorly sorted gravelly sand of the Oregon Till Member of the Glasford Formation.

88.7-110.0 Gray sandy loam diamicton of the Fairdale Till Member of the Glasford Formation.

110.0-117.0 Sand and gravel of the Fairdale Till Member of the Glasford Formation.

117.0-179.0 Gray sandy loam diamicton of the Kellerville Till Member(?) of the Glasford Formation.

179.0-190.5 Sand and gravel of the Kellerville Till Member of the Glasford Formation.

190.5-192.5 Sticky black clay of the Lierle Clay of the Banner Formation.

192.5-204.0 Dark grayish brown (10YR 4/2) loam diamicton of the Banner Formation.

204.0-218.5 Dolomite with wavy shaly laminae of the Kankakee Formation.

Detailed description

0.0-0.45 Very dark grayish brown (10YR 3/2) silt loam; soft; friable; abundant biopores; leached; abrupt, irregular boundary.

0.45-2.1 Dark yellowish brown (10YR 4/4) silty clay loam; weak medium granular structure; common fine sesquioxide concretions.

2.1-3.0	Core loss.
3.0-3.8	Light reddish brown (5YR 6/4) to brown (10YR 5/3) sandy loam to loam diamicton; few medium to large gravel; calcareous; sticky, becoming sandier with depth.
3.8-8.0	Core loss. Geophysical log indicates lithology as above.
8.0-13.5	Pinkish gray (7.5YR 6/2) loam diamicton; calcareous; firm; thin, discontinuous mangans around large clasts.
13.5-18.0	Brown (7.5YR 4.5/2) loam diamicton; near vertical planar discontinuities with dark brown (7.5YR 3/2) spotty mangans that become thicker and continuous with depth and rapidly oxidize to strong brown (7.5YR 5/8); calcareous.
18.0-18.4	Yellowish brown (10YR 5/4) sandy loam diamicton; calcareous; uniform; abrupt, smooth lower boundary.
18.4-19.0	Brown (7.5YR 5/2) silty clay loam with two large rounded and striated dolomite clasts as much as 0.2 ft across; uniform; abrupt, irregular boundary (clast protrudes into underlying unit).
19.0-19.2	Yellowish brown (10YR 5/4) sandy loam diamicton; calcareous; uniform; abrupt, smooth lower boundary.
19.2-23.0	Core loss. Geophysical log indicates lithology as above.
23.0-23.2	Yellowish brown (10YR 5/3) poorly sorted sand and gravel; disturbed; calcareous.
23.2-23.4	Reddish brown (2.5YR 4/5) loam; calcareous with thin interbeds of pinkish gray (5YR 7/2) silt loam; abrupt, crenulated boundaries between silt loam and loam.
23.4-23.8	Yellowish brown (10YR 5.3) sandy loam diamicton as above.
23.8-25.3	Yellowish brown (10YR 5./3) sandy loam with large reddish brown (2.5YR 4/5) domains; abrupt, irregular boundaries between domains; some finer subdomains in reddish zones; abrupt, wavy boundary; calcareous.
25.3-26.0	Yellowish brown (10YR 5/3) sandy loam diamicton; uniform; calcareous; firm.
26.0-26.6	Pinkish gray (7.5YR 6/2) loam diamicton similar in appearance to the diamicton from 13.5-18.0 ft.
26.6-27.1	As above, but with reddish yellow (7.5YR 6/8) sand-filled, planar discontinuities; disturbed; calcareous.
27.1-28.0	Core loss. Geophysical log indicates lithology as above.
28.0-30.8	As above; disturbed core; calcareous.
30.8-33.0	Core loss. Geophysical log indicates lithology as above.
33.0-34.1	Yellowish brown (10YR 5/4), well-sorted sand; calcareous; clear boundary.
34.1-34.4	Yellowish brown (10YR 5/4), moderately well-sorted coarse-grained sand; clear boundary.
34.4-34.9	Dark yellowish brown (10YR 4/4) well-sorted, very coarse-grained sand and fine gravel; disturbed; calcareous.
34.9-36.1	Disturbed core; very poorly sorted sand and gravel, and one clast of stratified diamicton.
36.1-38.0	Core loss. Geophysical log indicates lithology as above.
38.0-38.4	Light yellowish brown (10YR 6/4) well-sorted medium-grained sand; disturbed; calcareous.
38.4-41.8	Yellowish brown (10YR 5/4) sandy loam diamicton; three thin (0.01 ft. thick), wavy laminae of silt loam; friable; calcareous; uncommon strong brown (7.5YR 5/8) stains along horizontal partings, and around few (but not all) fine gravel clasts; clear boundary.
41.8-42.5	Dark gray (10YR 4.5/1) sandy loam diamicton; uniform; calcareous.
42.5-43.0	Core loss. Geophysical log indicates lithology as above.
43.0-44.1	Gray (10YR 5/1) to light yellowish brown (10YR 6/4) well-sorted, medium-grained sand; disturbed; calcareous.
44.1-48.0	Core loss. Geophysical log indicates lithology as above.
48.0-49.0	Recovery 1.0/1.0 ft; blow counts 170-210.

48.0-49.0 Grayish brown (10YR 5/2) loam diamicton; hard to somewhat friable; uniform; calcareous.

49.0-51.3 Grayish brown diamicton as above (return to continuous coring).

51.3-53.0 Core loss. Geophysical log indicates lithology as above.

53.0-56.0 As above.

56.0-58.0 Core loss. Geophysical log indicates lithology as above.

58.0-59.0 Recovery 0.0/0.0 ft; blow counts 196-145.

58.9-59.0 Core loss. Geophysical log indicates lithology as above.

59.0-60.0 Rotary drilled. Geophysical log indicates lithology as above.

60.0-70.0 As above (grayish brown (10YR 5/2) loam diamicton; hard to somewhat friable; uniform; calcareous).

70.0-70.1 Well-sorted medium-grained sand lense.

70.1-71.9 Ibid.

71.9-73.0 Core loss. Geophysical log indicates lithology as above.

73.0-75.8 As above (grayish brown (10YR 5/2) loam diamicton; hard to somewhat friable; uniform; calcareous).

75.8-83.0 Core loss. Geophysical log indicates lithologic change at 76.0 ft.

83.0-84.5 Recovery 1.5/1.5 ft; blow counts 59-78-82.

83.0-84.5 As above.

84.5-88.0 Rotary drilled. Geophysical log indicates lithology as above.

88.0-90.0 Recovery 1.3/2.0 ft; blow counts 19-27-41-38.

88.0-88.2 Poorly sorted angular gravel.

88.2-88.4 Poorly sorted sand and gravel.

88.4-88.7 Moderately well-sorted medium-grained sand.

88.7-89.7 Grayish brown (10YR 5/2) loam diamicton; hard to somewhat friable; uniform; calcareous

89.3-90.0 Core loss.

90.0-93.0 Rotary drilled. Geophysical log indicates lithology as above.

93.0-94.0 Recovery 1.0/1.0 ft; blow counts 50-183.

93.0-94.0 Grayish brown (10YR 5/2) sandy loam diamicton; stratification imparted by sandy, light brownish gray (10YR 6/2) laminae; calcareous.

94.0-98.0 Rotary drilled. Geophysical log indicates lithology as above.

98.0-100.0 Recovery 2.0/2.0 ft; blow counts 31-65-91-94.

98.0-100.0 Dark gray (5YR 4/1) sandy loam diamicton; uniform; calcareous.

100.0-103.0 Rotary drilled. Geophysical log indicates lithology as above.

103.0-105.0 Recovery 2.0/2.0 ft; blow counts 14-30-50-63.

103.0-105.0 As above (dark gray (5YR 4/1) sandy loam diamicton; uniform; calcareous).

105.0-108.0 Rotary drilled. Geophysical log indicates lithology as above.

108.0-110.0 Recovery 2.0/2.0 ft; blow counts 22-36-47-67.

108.0-110.0 Dark gray (5YR 4/1) sandy loam diamicton; uniform; calcareous; sand seam at 108.3 ft.

110.0-118.0 Rotary drilled. Geophysical log indicates a bed of sand and gravel from 110.0-117.0 ft.

118.0-120.0 Recovery 1.8/2.0 ft; blow counts 33-45-48-90.

118.0-119.8 Dark gray (5YR 4/1) sandy loam diamicton; uniform; calcareous.

120.0-128.0 Rotary drilled. Geophysical log indicates lithology as above.

128.0-130.0 Recovery 2.0/2.0 ft; blow counts 32-47-70-95.

128.0-130.0 As above (dark gray (5YR 4/1) sandy loam diamicton; uniform; calcareous).

130.0-138.0 Rotary drilled. Geophysical log indicates lithology as above.

138.0-140.0 Recovery 2.0/2.0 ft; blow counts 29-60-97-100.

138.0-140.0 As above (dark gray (5YR 4/1) sandy loam diamicton; uniform; calcareous).

140.0-148.0 Rotary drilled. Geophysical log indicates lithology as above.

148.0-150.0 Recovery 2.0/2.0 ft; blow counts 17-31-43-90.

148.0-150.0 As above (dark gray (5YR 4/1) sandy loam diamicton; uniform; calcareous).

150.0-158.0 Rotary drilled. Geophysical log indicates lithology as above.

158.0-160.0 Recovery 2.0/2.0 ft; blow counts 18-28-38-57.

158.0-160.0 As above (dark gray (5YR 4/1) sandy loam diamicton; uniform; calcareous), but with few wavy laminae of fine-grained sand.

160.0-168.0 Rotary drilled. Geophysical log indicates lithology as above.

168.0-170.0 Recovery 1.9/2.0 ft; blow counts 18-40-115-100/4".

168.0-169.9 Dark gray (5YR 4/1) sandy loam diamicton; uniform; calcareous.

170.0-178.0 Rotary drilled. Geophysical log indicates lithologic change at 178.0 ft.

178.0-179.0 Recovery 1.0/1.0 ft; blow counts 150-200.

178.0-179.0 Brown (10YR 5/3) very poorly sorted sand and gravel with a few reddish brown (10R 4/6) stains.

179.0-188.0 Rotary drilled. Geophysical log indicates lithology as above.

188.0-189.0 Recovery 1.0/1.0 ft; blow counts 98-230.

188.0-188.2 Brown (10YR 5/3) stratified sandy silt.

188.2-189.0 Brown sand and gravel as above.

189.0-190.5 Rotary drilled. Geophysical log indicates lithology as above.

190.5-192.5 Rotary drilled. Sticky black clay encountered but not sampled.

192.5-193.0 Rotary drilled. Sand and gravel (not sampled).

193.0-198.0 Rotary drilled. Diamicton as below (not sampled).

198.0-199.5 Recovery 1.5/1.5; blow counts 48-97-180.

198.0-199.5 Dark grayish brown (10YR 4/2) loam diamicton; calcareous; uniform with inclusions of leached silty clay with soil structure (argillans).

199.5-206.0 Rotary drilled. Geophysical log indicates lithology as above until bedrock encountered at 204.0 ft.

206.0-208.5 Recovery 2.5/2.5. Mottled light gray (5Y 6/1 and 5Y 7/2) dolomite with common, wavy discontinuous gray (N 4/0) to dark gray (5Y 4/1) shaly partings and laminae; uncommon calcite crystal-lined vugs.

208.5-209.8 Recovery 1.8/1.8. As above.

209.8-218.5 Recovery 8.2/8.7. Gray (5Y 5/1) dolomite with dark gray (5Y 4/1) wavy, web-like shale laminae.

209.2-218.0 Rotary drilled; geophysical log indicates lithologic change at 214.0 ft.

218.0-218.6 Recovery 0.6/0.6 ft; blow counts 125-150/1".

218.0-218.6 Grayish brown (2.5Y 5/2) loam diamicton; uniform; calcareous; very gravelly.

218.6-225.0 Rotary drilled; geophysical logs indicate lithology as above.

Begin rock coring.

225.0-232.2 Very pale brown (10YR 7/3) dolomite with white (10YR 8/1) chert nodules as much as 0.1 ft across; dolomite with uncommon wavy shale partings.

Complete loss of water circulation at 232.0 ft.

Boring MC-11, McHenry County Groundwater Protection

Location: Vogelsang Farm, 1500' SL, 1050' EL, Section 26, T44N, R7E, Woodstock 7 1/2' quad.

Elevation: 928 ft (283 m)

Measurements in feet; colors are on moist sediment.

Stratigraphic summary

0.0-5.5 Modern soil developed in Richland Loess
 5.5-23.3 Very poorly sorted sand and gravel of the Henry Formation.
 23.30-28.15 Gray silty clay diamicton; Yorkville Till Member of the Wedron Formation.
 28.15-≈163.0 Brown loam diamicton of the Tiskilwa Till Member.
 163.0- 225.0 Reddish brown loam diamicton of the Oregon Till Member of the Glasford Formation(?)
 225.0-232.3 Light brown, cherty dolomite of the Elwood Formation.
 *Lost all water return at 230.0 ft.

Detailed description:

0.0-0.7 Very dark grayish brown (10YR 3/2) silty clay loam; platy structure; abundant roots; sticky; abrupt, smooth boundary; leached.
 0.7-3.0 Dark yellowish brown (10YR 4/4) silty clay; numerous roots; coarse subangular blocky structure; soft; thin, discontinuous argillans; uncommon sesquioxide splotches; leached.
 3.0-5.5 Dark yellowish brown (10YR 4/4) silty clay to sandy loam, becoming sandier at base; loss of soil structure with depth; leached.
 5.5-13.0 Dark yellowish brown (10YR 4/4) very poorly sorted sand and gravel, from fine-grained sand to well-rounded cobbles as much as 0.03' across; disturbed sample; becomes calcareous between 8 and 13'.
 13.0-18.0 Dark yellowish brown (10YR 4/6) very poorly sorted sand and gravel; medium- to coarse-grained sand with large gravel; calcareous.
 18.0-23.0 Brown (10YR 4.5/3) sand and gravel as above; siltier at base; calcareous.
 23.0-25.0 Recovery 1.7/2.0 ft; blow counts 8-6-9-16.
 23.0-23.3 Dark grayish brown (10YR 4/2) medium- to coarse-grained sand with gravel as much as 0.02 ft across; calcareous; abrupt lower boundary.
 23.3-24.7 Dark gray (10YR 4/1) silty clay loam diamicton; firm; uniform.
 25.0-28.0 Rotary drilled; geophysical log indicates lithology as above.
 28.0-30.0 Recovery 2.0/2.0 ft; blow counts 6-8-11-14.
 28.0-28.15 Dark gray (10YR 4/1) silty clay loam diamicton; firm; uniform; abrupt, irregular lower boundary; calcareous.
 28.15-30.0 Dark grayish brown (10YR 4.2) clay loam; uniform; hard; calcareous.
 30.0-33.0 Rotary drilled; geophysical log indicates lithology as above.
 33.0-35.0 Recovery 0.8/2.0 ft; blow counts 11-13-20-22.
 33.0-33.8 Grayish brown (10YR 5/2) loam diamicton; soft drilling; hard core; calcareous; uniform.
 33.8-35.0 Core loss.
 35.0-38.0 Rotary drilled; geophysical log indicates lithology as above.
 38.0-40.0 Recovery 1.8/2.0 ft; blow counts 11-13-20-22.

38.0-39.8	Grayish brown (10YR 5/2) loam diamicton as above.
40.0-43.0	Rotary drilled; geophysical log indicates lithology as above.
43.0-45.0	Recovery 2.0/2.0 ft; blow counts 5-7-9-12.
43.0-45.0	Grayish brown (10YR 5/2) loam diamicton as above.
45.0-48.0	Rotary drilled; geophysical log indicates lithology as above.
48.0-50.0	Recovery 1.3/2.0 ft; blow counts 5-9-14-19.
48.0-49.3	Grayish brown (10YR 5/2) loam diamicton as above.
50.0-53.0	Rotary drilled; geophysical log indicates lithology as above.
53.0-55.0	Recovery 1.7/2.0 ft; blow counts 8-10-14-30.
53.0-54.7	Brown (7.5YR 5/2) loam diamicton; hard; calcareous.
55.0-58.0	Rotary drilled; geophysical log indicates lithology as above.
58.0-60.0	Recovery 2.0/2.0 ft; blow counts 5-10-14-19.
58.0-60.0	Brown (7.5YR 5/2) loam diamicton; hard; calcareous.
60.0-63.0	Rotary drilled; geophysical log indicates lithology as above.
63.0-65.0	Recovery 2.0/2.0 ft; blow counts 9-16-22-26.
63.0-65.0	Brown to dark brown (7.5YR 4/2) loam diamicton; hard; calcareous.
65.0-68.0	Rotary drilled; geophysical log indicates lithology as above.
68.0-70.0	Recovery 1.8/2.0 ft; blow counts 8-12-16-21.
68.0-69.8	Brown to dark brown (7.5YR 4/2) loam diamicton; hard; calcareous.
70.0-73.0	Rotary drilled; geophysical log indicates lithology as above.
73.0-75.0	Recovery 2.0/2.0 ft; blow counts 5-9-11-17.
73.0-75.0	Brown to dark brown (7.5YR 4/2) loam diamicton; hard; calcareous.
75.0-78.0	Rotary drilled; geophysical log indicates lithology as above.
78.0-80.0	Recovery 0.8/2.0 ft; blow counts 17-19-29-22.
78.0-78.8	Brown to dark brown (7.5YR 4/2) loam diamicton; hard; calcareous.
78.8-80.0	Core loss
80.0-83.0	Rotary drilled; geophysical log indicates lithology as above.
83.0-85.0	Recovery 2.0/2.0 ft; blow counts 6-9-12-15.
83.0-85.0	Dark brown to very dark brown (7.5YR 3.5/2) loam diamicton; hard; calcareous.
85.0-88.0	Rotary drilled; geophysical log indicates lithology as above.
88.0-90.0	Recovery 2.0/2.0 ft; blow counts 6-8-10-14.
88.0-90.0	Dark brown to very dark brown (7.5YR 3.5/2) loam diamicton; hard; calcareous.
90.0-93.0	Rotary drilled; geophysical log indicates lithology as above.
93.0-95.0	Recovery 1.6/2.0 ft; blow counts 6-9-12-14.
93.0-94.6	Dark brown to very dark brown (7.5YR 3.5/2) loam diamicton; hard; calcareous.
95.0-98.0	Rotary drilled; geophysical log indicates lithology as above.
98.0-100.0	Recovery 2.0/2.0 ft; blow counts 6-11-14-17.
88.0-100.0	Dark brown (7.5YR 4/2) loam diamicton; soft; calcareous.
100.0-108.0	Rotary drilled; geophysical log indicates lithology as above.
108.0-110.0	Recovery 2.0/2.0 ft; blow counts 12-18-28-40.
108.0-110.0	Dark brown (7.5YR 4/2) loam diamicton; soft; calcareous.
110.0-113.0	Rotary drilled; geophysical log indicates lithology as

above.

113.0-115.0 Recovery 1.8/2.0 ft; blow counts 9-14-22-38.

113.0-114.8 Dark brown (7.5YR 4/2) loam diamicton; soft; calcareous.

115.0-123.0 Rotary drilled; geophysical log indicates lithology as above.

123.0-125.0 Recovery 2.0/2.0 ft; blow counts 11-19-31-48.

123.0-125.0 Brown to dark brown (10YR 4.5/2) loam diamicton; hard; calcareous.

125.0-133.0 Rotary drilled; geophysical log indicates lithology as above.

133.0-135.0 Recovery 2.0/2.0 ft; blow counts 10-17-31-38.

133.0-135.0 Brown to dark brown (10YR 4.5/2) loam diamicton; hard; calcareous.

135.0-138.0 Rotary drilled; geophysical log indicates lithology as above.

138.0-140.0 Recovery 2.0/2.0 ft; blow counts 8-14-23-35.

138.0-140.0 Brown to dark brown (10YR 4.5/2) loam diamicton; hard; calcareous.

140.0-148.0 Rotary drilled; geophysical log indicates lithology as above.

148.0-150.0 Recovery 2.0/2.0 ft; blow counts 14-23-30-51.

148.0-150.0 Brown to dark brown (10YR 4.5/2) loam diamicton; hard; calcareous.

150.0-158.0 Rotary drilled; geophysical log indicates lithology as above.

158.0-160.0 Recovery 0.0/2.0 ft; blow counts 50-75-96-140.

158.0-160.0 Core loss.

160.0-163.0 Rotary drilled; geophysical log indicates lithologic change at \approx 163.0 ft.

163.0-164.0 Recovery 1.0/1.0 ft; blow counts 23-110.

163.0-164.0 Dark reddish gray (5Y 4/2) loam diamicton; hard and rocky drilling; very hard; calcareous; more rocks, and sandier than above.

164.0-168.0 Rotary drilled; geophysical log indicates lithology as above.

168.0-168.8 Recovery 0.8/0.8 ft; blow counts 80-100/3".

168.0-168.8 Dark reddish gray (5Y 4/2) loam diamicton; hard and rocky drilling; very hard; calcareous; more rocks, and sandier than above.

168.8-178.0 Rotary drilled; geophysical log indicates lithology as above.

178.0-179.0 Recovery 1.0/1.0 ft; blow counts 83-155.

178.0-179.0 Dark reddish gray (5Y 4/2) loam diamicton; hard and rocky drilling; very hard; calcareous.

179.0-188.0 Rotary drilled; geophysical log indicates lithology as above.

188.0-189.0 Recovery 1.0/1.0 ft; blow counts 70-115.

188.0-189.0 Dark reddish gray (5Y 4/2) loam diamicton; hard and rocky drilling; very hard; calcareous.

189.0-198.0 Rotary drilled; geophysical log indicates lithology as above.

198.0-199.5 Recovery 1.5/1.5 ft; blow counts 32-73-130.

198.0-199.5 Dark reddish gray (5Y 4/2) loam diamicton; hard and rocky drilling; very hard; calcareous.

189.0-198.0 Rotary drilled; geophysical log indicates lithology as above.

198.0-199.5 Recovery 1.5/1.5 ft; blow counts 32-73-130.

198.0-199.5 Dark reddish gray (5Y 4/2) loam diamicton; hard and rocky drilling; very hard; calcareous.

199.5-208.0 Rotary drilled; geophysical log indicates lithology as above.

208.0-209.2 Recovery 1.2/1.2 ft; blow counts 55-70-100/2".

208.0-209.2 Dark grayish brown (10YR 4/2) gravelly loam diamicton; hard; few sand seams, including one light gray (10YR 6/2) coarse-silt to very-fine grained sand seam at 209.0 ft.

209.2-218.0 Rotary drilled; geophysical log indicates lithologic change at 214.0 ft.

218.0-218.6 Recovery 0.6/0.6 ft; blow counts 125-150/1".

218.0-218.6 Grayish brown (2.5Y 5/2) loam diamicton; uniform; calcareous; very gravelly.

218.6-225.0 Rotary drilled; geophysical logs indicate lithology as above.

Begin rock coring.

225.0-232.2 Very pale brown (10YR 7/3) dolomite with white (10YR 8/1) chert nodules as much as 0.1 ft across; dolomite with uncommon wavy shale partings.

Complete loss of water circulation at 232.0 ft.

Boring MC-12, McHenry County Groundwater Protection

Location: Breit Farm, 700' EL and 2250' SL, Section 26, T43N, R6E, Huntley 7 1/2' quad.

Elevation: 895 ft (273 m)

Measurements in feet; colors are on moist sediment.

Stratigraphic summary

0.0-2.1 A horizon of the Modern Soil developed in Peyton Colluvium.

2.1-6.0 Bt horizon of the Modern Soil developed in Peyton Colluvium.

6.0-13.9 C2 horizon of the Modern Soil developed in the Tiskilwa Till Member of the Wedron Formation.

13.9-37.0 unweathered loam diamicton of the Tiskilwa Till Member.

37.0-43.0 Poorly sorted sand and gravel and stratified diamicton of the Tiskilwa Till Member.

43.0-56.0 Ibid.

56.0-60.5 Stratified gravelly sand of the Tiskilwa Till Member.

60.5-80.5 Brown loam diamicton of the Tiskilwa Till Member.

80.5-100.5 Poorly sorted sand and gravel of the Ashmore Member of the Wedron Formation.

100.5-106.0 Buried AO horizon of the Farmdale Geosol developed in the Robein Silt.

106.0-113.2 C3 and C4 horizon of the Farmdale Geosol developed in an unnamed loam till member of the Glasford Formation (the Sangamon Geosol apparently was truncated at this site)

113.2-125.0 Sand and gravel of the Glasford Formation.

125.0-165.0 Gray to dark gray loam to silty clay loam diamicton of the Oregon Till Member of the Glasford Formation.

165.0-191.0 Gray loam diamicton of the Fairdale Till Member of the Glasford Formation(?); geophysical log and descriptions suggest this is a different unit than above, and contains more abundant inclusions of bedrock, and layers of sand and gravel which cannot be differentiated from bedrock fragments on the geophysical log. Sampled layers of sorted sediment from depths of 167.0-168.5 and 173.0-173.2 ft.

191.0-201.5 Interbedded shaly dolomitic fossiliferous packstone and grainstone of the Maquoketa Formation.

Detailed description:

- 0.0-2.1 Dark brown (10YR 3/3) silt loam with few small gravel; friable; few biopores, weak, fine granular structure; abrupt, irregular boundary; leached.
- 2.1-4.2 Very dark brown (10YR 2/2) silty clay loam diamicton; thin, continuous argillans with medium fine subangular blocky structure; abundant black (10YR 2/1) sesquioxide concretions; gradual boundary, leached.
- 4.2-4.5 Dark yellowish brown (10YR 4/4) silty clay loam diamicton; thick, continuous, dark grey (10YR 4/1) argillans abundant black sesquioxide concretions; clear boundary; leached.
- 4.5-4.9 Olive gray (5Y 5/2) silty clay loam diamicton; thick, continuous, dark gray (5Y 4/1) argillans; abundant sesquioxide concretions; clear boundary; leached.
- 4.9-5.5 Disrupted zone of two cross-cutting krotovina; one set of krotovina is filled with strong brown (7.5YR 5/8) sandy loam diamicton, and the other set of krotovina is filled with black (10YR 2/1) silty clay loam; abrupt irregular boundary; leached.
- 5.5-6.0 Brown (10YR 5/3) silty clay loam diamicton with yellowish brown (10YR 5/6) domains; thick, continuous, dark grayish brown (10YR 4/2) argillans; abundant sesquioxide concretions; abrupt smooth boundary; leached.
- 6.0-8.0 Strong brown (7.5YR 4/6) loam diamicton; calcareous; abundant krotovina filled with black (10YR 2/1) silty clay; clear boundary; calcareous.
- 8.0-11.2 Dark yellowish brown (10YR 4/4) sandy loam diamicton; coarse blocky structure with thin, discontinuous mangans; clear boundary; calcareous.
- 11.2-13.9 Brownish yellow (10YR 6/6) to light brown (7.5YR 6/4) sandy loam diamicton; coarse, blocky structure with thin discontinuous mangans; abrupt lower boundary; calcareous.
- 13.9-19.6 Brown (10YR 5/3) loam diamicton; uniform; calcareous.
- 19.6-20.3 Yellowish brown (10YR 5/6) loam diamicton; appears to be an inclusion of oxidized material; abrupt irregular boundaries; calcareous.
- 20.3-20.7 Brown (10YR 5/3) loam diamicton; uniform; abrupt lower boundary; calcareous.
- 20.7-23.0 Core loss. Geophysical log indicates lithology as above.
- 23.0-24.7 Sediment m lange with abrupt irregular contacts; lithologies include poorly sorted brown (10YR 5/3) medium-grained sand to medium gravel, light brownish gray (10YR 6/2) loam diamicton, and yellowish brown (10YR 5/6) loam diamicton; calcareous.
- 24.7-28.0 Brown (7.5YR 5/2) loam diamicton; uniform; calcareous.
- 28.0-30.0 Core loss. Geophysical log indicates lithology as above.
- 30.0-32.4 Brown (7.5YR 5/2) loam diamicton as above; uniform; calcareous.
- 32.4-32.7 Brown (7.5YR 5/2), well-sorted medium-grained sand.
- 32.7-38.0 Brown diamicton as above.
- 38.0-39.0 Brown (7.5YR 5/2) loam diamicton as above with abundant inclusions of strong brown (7.5YR 5/6) coarse-grain sand; calcareous.
- 39.0-40.0 Yellowish brown (10YR 5/6) moderately well-sorted very coarse-grained sand to medium gravel; calcareous.
- 40.0-42.0 Very poorly sorted sand and gravel; largest clast is 0.15' across.
- 42.0-43.0 Core loss. Geophysical log indicates lithology as above.
- 43.0-45.0 Recovery 1.6/2.0 ft; blow counts 20-15-16-18.
- 43.0-43.1 Disturbed sample; loam diamicton.
- 43.1-43.4 Strong brown (7.5YR 5/8) and brown (7.5YR 4.5/2) color-banded stratified loam diamicton; abrupt boundaries between

bands; calcareous.

43.4-44.6 Brown (7.5YR 5/2) loam diamicton; uniform; calcareous.

44.6-45.0 Core loss.

45.0-48.0 Rotary drilled. Geophysical log indicates lithology as above.

48.0-50.0 Recovery 1.8/2.0 ft; blow counts 13-20-23-19.

48.0-49.8 Brown (7.5YR 5/2) loam diamicton; uniform; calcareous.

50.0-53.0 Rotary drilled. Geophysical log indicates lithology as above.

53.0-55.0 Recovery 2.0/2.0 ft; blow counts 10-12-15-18.

53.0-55.0 Brown (7.5YR 5/2) loam diamicton as above; uniform; calcareous.

55.0-58.0 Rotary drilled. Geophysical log indicates lithologic change at about 56.0 ft.

58.0-60.0 Recovery 1.5/2.0 ft; blow counts 28-31-21-16.

58.0-58.3 Grayish brown (10YR 5/2) well-sorted pea gravel

58.3-59.5 Very poorly-sorted medium-grained sand to small cobbles; calcareous; disturbed.

59.5-60.0 Core loss.

60.0-63.0 Rotary drilled. Geophysical log indicates lithologic change at 60.5 ft..

63.0-65.0 Recovery 1.9/2.0 ft; blow counts 10-12-17-22.

63.0-64.9 Brown (7.5YR 5/2) loam diamicton; uniform; calcareous.

65.0-68.0 Rotary drilled. Geophysical log indicates lithology as above.

68.0-70.0 Recovery 2.0/2.0 ft; blow counts 8-11-15-19.

68.0-70.0 Brown (7.5YR 5/2) loam diamicton as above; uniform; calcareous.

70.0-73.0 Rotary drilled. Geophysical log indicates lithology as above.

73.0-75.0 Recovery 2.0/2.0 ft; blow counts 6-7-11-13.

73.0-75.0 Brown (7.5YR 5/2) loam diamicton as above; uniform; calcareous.

75.0-83.0 Rotary drilled. The driller and the geophysical log indicate a lithologic change at 80.5 ft.

83.0-85.0 Recovery 1.0/2.0 ft; blow counts 20-18-15-10.

83.0-83.9 Brown (7.5YR 5/2) sandy loam diamicton; loose; calcareous.

83.9-84.0 Grayish brown (10YR 5/2) poorly-sorted medium-grained sand to medium gravel; calcareous.

84.0-85.0 Core loss; geophysical log indicates a lithology of sand and gravel.

85.0-88.0 Rotary drilled; geophysical log indicates lithology as above.

88.0-90.0 Recovery 1.1/2.0 ft; blow counts 17-13-15-19.

88.0-89.1 Grayish brown (10YR 5/2) poorly-sorted medium-grained sand to medium gravel as above.

89.1-90.0 Core loss; geophysical log indicates lithology as above.

90.0-93.0 Rotary drilled; geophysical log indicates lithology as above.

93.0-95.0 Recovery 1.1/2.0 ft; blow counts 26-25-26-27.

93.0-94.1 Grayish brown (10YR 5/2) poorly-sorted medium-grained sand to medium gravel as above.

94.1-95.0 Core loss; geophysical log indicates lithology as above.

95.0-98.0 Rotary drilled; geophysical log indicates lithology as above.

98.0-100.0 Recovery 1.4/2.0 ft; blow counts 23-26-30-24

98.0-99.4 Grayish brown (10YR 5/2) poorly-sorted medium-grained sand to medium gravel as above.

99.4-100.0 Core loss; geophysical log indicates lithology as above.

100.0-103.0 Rotary drilled; driller and geophysical log indicate lithologic change at 101.0 ft.

103.0-105.0 Recovery 1.8/2.0 ft; blow counts 13-24-37-53.

103.0-104.8	Black (10YR 2/1) fibric to hemic peat; strong medium to fine platy structure; leached.
105.0-108.0	Rotary drilled; geophysical log indicates a lithologic change at 106.0 ft.
108.0-110.0	Recovery 2.1/2.0 ft; blow counts 7-7-8-11
108.0-110.0	Brown (10YR 5/2) loam diamicton; coarse, angular blocky structure with yellowish brown (10YR 5/6) stains along ped faces; calcareous.
110.0-113.0	Rotary drilled; geophysical log indicates lithology as above.
113.0-115.0	Recovery 1.4/2.0 ft; blow counts 43-47-44-52.
113.0-113.2	Loam diamicton as above
113.2-114.4	Light olive brown (2.5Y 5/4) very poorly-sorted medium-grained sand to coarse gravel; calcareous.
114.4-115.0	Core loss; geophysical log indicates lithology as above.
115.0-118.0	Rotary drilled; geophysical log indicates lithology as above.
118.0-120.0	Recovery 1.6/2.0 ft; blow counts 28-35-40-52.
118.0-119.0	Grayish brown (2.5Y 5/2) well sorted, stratified fine grained sand; calcareous.
119.0-119.6	Grayish brown (2.5Y 5/2) moderately well-sorted fine- to medium-grained sand.
120.0-123.0	Rotary drilled; geophysical log indicates lithology as above.
123.0-125.0	Recovery 1.3/2.0 ft; blow counts 30-45-47-60.
123.0-123.5	Yellowish brown (10YR 5/4) poorly-sorted medium-grained sand to medium gravel; disturbed.
123.5-124.3	as above, but well-sorted medium-grained sand.
124.3-125.0	Core loss.
125.0-133.0	Rotary drilled; geophysical log indicates lithologic change at 125.0 ft.
133.0-135.0	Recovery 1.9/2.0 ft; blow counts 9-30-67-65.
133.0-134.1	Dark grayish brown (10YR 4/2) silty clay loam diamicton; calcareous; not many pebbles or gravel.
134.1-134.7	Stratified medium grained sand with thin beds composed of silt loam near top.
134.7-134.9	Diamicton as above.
135.0-143.0	Rotary drilled; geophysical log indicates lithology as above.
143.0-145.0	Recovery 1.7/2.0 ft; blow counts 22-15-20-27.
143.0-143.1	Dark greyish brown (10YR 4/2) loam diamicton; uniform; calcareous.
143.1-144.7	Stratified silt loam and well-sorted fine-grained sand; disturbed.
145.0-148.0	Rotary drilled; geophysical log indicates lithology composed of diamicton as below.
148.0-150.0	Recovery 2.0/2.0 ft; blow counts 6-13-21-29.
148.0-150.0	Dark grey (10YR 4/1) loam diamicton; medium-grained sand seam at 149.6' that is .001' thick; calcareous.
150.0-153.0	Rotary drilled; geophysical log indicates lithology composed of diamicton as above.
153.0-155.0	Recovery 2.0/2.0 ft; blow counts 7-15-22-15-20-27.
153.0-155.0	Dark grey (10YR 4/1) loam diamicton as above.
155.0-158.0	Rotary drilled; geophysical log indicates lithology as above.
158.0-160.0	Recovery 2.1/2.0 ft; blow counts 20-40-50-70.
158.0-160.1	Gray (5Y 5/1) loam diamicton; inclusions of leached, very dark gray (5Y 3/1) silty clay at base (159.9-160.1 ft.)
160.1-163.0	Rotary drilled; geophysical log indicates lithology as above.
163.0-165.0	Recovery 1.3/2.0 ft; blow counts 22-43-60-83.

163.0-164.3	Ribboned sample composed of gray (5Y 5/1) loam diamicton as above.
164.3-165.0	Core loss.
165.0-168.0	Rotary drilled; geophysical log indicates lithology as above.
168.0-169.0	Recovery 1.0/1.0 ft; blow counts 22-180.
168.0-169.0	Gray (5Y 5/1) loam diamicton as above.
169.0-173.0	Rotary drilled; geophysical log indicates gradational contact.
173.0-175.0	Recovery 1.9/2.0 ft; blow counts 98-90-57-54.
173.0-173.2	Poorly sorted gravelly coarse- to medium-grained sand.
173.2-174.9	Gray (5Y 5/1) loam diamicton as above.
175.0-178.0	Rotary drilled; geophysical log indicates lithology as above.
178.0-179.0	Recovery 1.0/1.0 ft; blow counts 30-150.
178.0-179.0	Gray (5Y 5/1) loam diamicton as above.
179.0-183.0	Rotary drilled; geophysical log indicates lithology as above.
183.0-183.5	Recovery 0.5/0.5 ft; blow counts 260.
183.0-183.5	Non-uniform, gray (10YR 5.5/1) loam to clay loam; two partings in core cause by disintegration of flaggy carbonate bedrock fragments; sand content is non-uniform in matrix; clayier zones observed below some clasts; calcareous.
183.5-191.0	Rotary drilled; driller's log indicates lithology composed of gravelly till with numerous bedrock fragments.
191.0-192.0	Bedrock cored; recovery 1.0/1.0 ft. Broken fragments of dolomite as below.
192.0-202.0	Recovery 9.5/10.0 ft.
192.0-193.3	White (10YR 8/1) coarse-grained, fossiliferous dolomitic grainstone with abundant dark greenish gray (5G 4/1) shale laminae (cross-bed drapes?).
193.3-193.4	Very dark gray (5Y 3/1) shale; abrupt contacts.
193.4-195.0	Gray (5Y 6/1) fine-grained packstone; planar stratification.
195.0-195.3	Shaly interval as above, with one layer 0.2' thick with abundant, small lenses of packstone.
195.3-195.8	Grainstone as above.
195.8-195.9	Shale as above.
195.9-201.5	Packstone as above, with wavy to planar shaly partings every 0.2' or so; becoming more abundant with depth. Few zones contain healed discontinuities; uncommon pyrite crystals were observed on the surfaces of some discontinuities.

Boring MC-13, McHenry County Groundwater Protection

Location: Rumelin Farm, 320' SL, 115' WL, Section 7, 46N, R9E, Fox Lake 7 1/2 ' quad

Elevation: 929 ft (283 m)

Measurements in feet; colors are on moist sediment.

Stratigraphic summary

0.0-1.1	Modern soil developed in Richland Loess.
1.1-26.5	Sandy loam diamicton of the Haegar Till Member of the Wedron Formation.
26.5-65.5	Gravelly, stratified sand of the Haegar Till Member.
65.5-84.2	Well-sorted sand and silty sand of the Haegar Till Member.
84.2-87.0	Brown silty sand and gravel of the Haegar Till Member
87.0-178.0	Silty clay loam, silt loam, and silty clay rhythmites, convoluted bedding; based on clay mineralogy, related to the Tiskilwa Till Member.

178.0-213.0	Brown loam diamicton interbedded with sand and gravel and silt loam of the Tiskilwa Till Member.
213.0-~247.0	Brown (10YR) sand and gravel of the Ashmore Member of the Wedron Formation.
~247.0-291.0	Olive (2.5/Y) sand and gravel of the Ashmore Member of the Wedron Formation.
291.0-299.0	Unnamed till member of the Glasford Formation.
299.0-311.0	Sand and gravel related to the overlying unnamed till unit.
311-321	Cherty dolomite of the Elwood Formation.

Detailed description:

0.0-0.4	Very dark grayish brown (10YR 3/2) silty clay loam; abundant roots; leached; soft; irregular, abrupt lower boundary.
0.4-1.1	Brown (10YR 4/3) silty clay loam; two, fat, juicy earthworms at base; weak, medium subangular blocky structure; irregular, abrupt lower boundary; leached.
1.1-2.7	Yellowish brown (10YR 4.5/6) clay loam; weak, fine to medium subangular blocky structure; medium, continuous, yellowish brown (10YR 5/6) argillans; black (10YR 3/1), soft, sesquioxide accumulations, small at top, becoming larger at the base; leached.
2.7-3.0	Core loss.
3.0-3.5	As above.
3.50-3.65	Light olive brown (2.5Y 5/4) silt loam; soft; abrupt upper and lower contacts; leached.
3.65-4.50	Yellowish brown (10YR 5/4) sandy loam diamicton; friable; slowly calcareous.
4.5-8.0	Core loss.
8.0-10.2	As above; few zones are more yellow (10YR 5.5/4) and friable; calcareous.
10.2-13.0	Core loss.
13.0-15.6	As above.
15.6-18.0	Core loss.
18.00-20.15	As above.
20.15-20.25	Yellowish brown (10YR 5/4) silty clay; uniform; abrupt, smooth upper and lower contact; slowly calcareous.
20.25-20.50	Varicolored, oxidized sand and gravel.
20.5-20.6	The two units above, mixed, with irregular, abrupt contacts.
20.6-20.8	Rotten, fractured fine-grained crystalline rock.
20.8-21.0	Very dark gray (10YR 3/1) silt loam; shale-like, fractured, with blebs of gray (5Y 5/1) silty clay 0.50 to 0.75 cm across; abrupt, irregular contact; slowly calcareous.
21.0-23.0	Core loss.
23.0-23.4	Yellowish brown (10YR 5/4) loose sandy loam diamicton; few large clasts three to six inches across; calcareous.
23.4-24.2	Coherent sandy loam diamicton.
24.2-24.4	Ibid. (loose sandy loam diamicton).
24.4-24.7	Ibid. (coherent sandy loam diamicton).
24.7-25.2	Ibid. (loose sandy loam diamicton).
25.2-25.5	Ibid. (coherent sandy loam diamicton).
25.5-28.0	Core loss.
28.0-28.2	Yellowish brown (10YR 5/4) sandy loam diamicton; coherent, but friable; calcareous.
28.2-33.0	Core loss.
33.0-34.7	Light yellowish brown (10YR 6/4) moderately well-sorted medium-grained sand with uncommon small gravel; calcareous.
34.7-38.0	Core loss; geophysical log indicates lithology as above.
38.0-40.0	As above.
40.0-43.0	Core loss; geophysical log indicates lithology as above.
43.0-45.0	Very pale brown (10YR 7/3), poorly sorted sand and gravel;

calcareous.

45.0-48.0 Core loss; geophysical log indicates lithology as above.
 48.0-50.0 Yellowish brown (10YR 5/6) well-sorted, medium-grained sand; vaguely stratified; calcareous.
 50.0-53.0 Core loss.
 53.00-54.75 Yellowish brown (10YR 5/6) well-sorted, medium-grained sand, as above.
 54.75-55.20 Very poorly sorted sandy gravel; largest clast 0.07 ft. across.
 Set casing to 55 ft.
 55.2-58.0 Core loss; geophysical log indicates lithology as above.
 58.0-63.0 Rotary drilled; from 58.0 to 63.0 ft; geophysical log indicates lithology as above.
 63.0-65.0 Recovery 1.2/2.0 ft; blow counts 21-23-32-35.
 63.0-63.2 Very poorly sorted sandy gravel, as above; abrupt, smooth lower contact.
 63.2-64.2 Brown (10YR 5/3) fine-grained sand; vaguely stratified.
 64.2-65.0 Core loss.
 65.0-68.0 Rotary drilled; geophysical log indicates lithology as above.
 68.0-70.0 Recovery 1.7/2.0 ft; blow counts 18-21-23-29.
 68.0-69.7 Brown (10YR 5/3) fine-grained sand with few black (10YR 3/1) laminae and wood and moss(?) fragments; bed of yellowish brown medium-grained sand from 68.7-68.9 ft.
 69.7-70.0 Core loss.
 70.0-73.0 Rotary drilled; geophysical log indicates lithology as above.
 73.0-75.0 Recovery 1.7/2.0 ft; blow counts 16-19-21-24.
 73.0-74.7 Brown (7.5YR 5/2), vaguely stratified well sorted, medium-grained sand with few coarse fragments of wood fragments. One layer of peat from 73.45 - 73.50 ft; abrupt, wavy boundaries with sand. Sand is calcareous.
 74.7-75.0 Core loss.
 75.0-78.0 Rotary drilled; geophysical log indicates lithology as above.
 78.0-80.0 Recovery 1.5/2.0 ft; blow counts 12-11-12-16.
 78.0-79.5 Brown (7.5YR 5/2) well-sorted, fine- to medium-grained sand; stratified to uniform; few flecks of organic matter; interval from 78.3 to 78.5 ft with convoluted bedding.
 79.5-80.0 Core loss.
 80.0-83.0 Rotary drilled; geophysical log indicates lithology as above.
 83.0-85.0 Recovery 1.45/2.00; blow counts 5-13-12-14.
 83.0-83.4 Brown (7.5YR 5/2) very fine-grained sand; uniform.
 83.40-83.45 Uniform silty clay.
 83.45-83.55 Two thin beds of clay interbedded with very fine-grained sand.
 83.55-84.1 Very fine-grained sand; uniform.
 84.1-84.2 Thin interbeds of clay and very fine-grained sand.
 84.2-84.3 Dark gray (5Y 4/1) clay loam diamicton; uniform; abrupt, irregular contacts; calcareous.
 84.3-84.45 Brown (7.5YR 5/2) clay loam diamicton; uniform; calcareous.
 84.45-85.0 Core loss.
 85.0-88.0 Rotary drilled; geophysical log indicates lithology as above.
 88.0-90.0 Recovery 1.5/2.0 ft; blow counts 19-19-21-23.
 88.0-88.5 and 89.0 - 89.5 Brown (7.5YR 5/2) stratified fine- to medium-grained sand; calcareous.
 88.5-89.0 Brown (7.5YR 5/2) stratified sand loam diamicton.
 89.5-90.0 Core loss.
 90.0-93.0 Rotary drilled; geophysical log indicates lithology as

	above.
93.0-95.0	Recovery 1.8/2.0 ft; blow counts 14-18-20-26.
93.0-93.9	Brown (10YR 5/3), stratified, fine- to medium-grained loamy sand with thin layers of organic-matter rich sediment, including one black (10YR 2/1) silty clay layer from 93.45 to 93.47 ft, and four dark yellowish brown (10YR 4/4) organic-rich laminae.
93.9-94.8	Brown (10YR to 7.5YR 5/3), stratified, fine- to medium-grained sand.
94.8-95.0	Core loss.
95.0-98.0	Rotary drilled; geophysical log indicates lithology as above.
98.0-100.0	Recovery 1.8/2.0 ft; blow counts 8-9-10-14.
98.0-99.8	Brown (7.5YR 5/2), stratified silty fine- to very fine-grained sand; calcareous.
99.8-100.0	Core loss.
100.0-103.0	Rotary drilled; geophysical log indicates lithology as above.
103.0-105.0	Recovery 1.6/2.0 ft; blow counts 18-12-22-24.
103.0-104.6	Grayish brown (10YR 5/2) vaguely stratified, very fine-grained sand to coarse silt with one layer of brown (7.5YR 5/2) silty clay; calcareous.
104.6-105.0	Core loss.
105.0-108.0	Rotary drilled; geophysical log indicates lithology as above.
108.0-110.0	Recovery 1.7/2.0; blow counts 13-15-35-70.
108.0-109.7	Interbedded brown (7.5YR 5/2) silty clay and grayish brown (10YR 5/2) very fine-grained sand and silt, and fine-grained sand; two small gravel-sized fragments (ice-rafted debris?).
109.7-110.0	Core loss.
110.0-113.0	Rotary drilled; geophysical log indicates lithology as above, although driller noted resistance to drilling near the end of the run.
113.0-114.7	Recovery 1.7/1.7 recovery; blow counts 43-80-65-100/4"
110.0-111.7	Stratified grayish brown (10YR 5/2) fine- and very fine-grained sand, and silt; discontinuous, dark brown (10YR 4/4) layers of organic-rich sediment; few fragments of gravel at base.
111.7-113.0	Rotary drilled; geophysical log indicates lithology as above.
113.0-115.0	Recovery 1.5/2.0 ft; blow counts 25-27-39-43.
118.0-119.5	As above.
119.5-120.0	Core loss.
120.0-123.0	Rotary drilled; geophysical log indicates lithology as above.
123.0-125.0	Recovery 1.9/2.0 ft; blow counts 17-27-31-34.
123.0-124.9	Stratified grayish brown (10YR 5/2) fine- and very fine-grained sand, and silt; with rounded interclasts of gray (5Y 5/1) clay and brown (7.5YR 5/2) clay or fine-grained sand from 123.0-123.5 ft.
124.9-125.0	Core loss.
125.0-128.0	Rotary drilled; geophysical log indicates lithology as above.
128.0-130.0	Recovery 1.5/2.0 ft; blow counts 30-24-31-63.
128.0-129.5	Stratified grayish brown (10YR 5/2) fine- to very fine-grained sandy loam diamicton, and thin, brown (7.5YR 5/2) layers of silty clay; one silty clay bed occurs from 128.7-128.9 ft; gravel- sized clasts are as large as 0.05' across (noticeably larger than above).
129.5-130.0	Core loss.
130.0-133.0	Rotary drilled; geophysical log indicates lithology as above.

133.0-135.0	Recovery 2.0/2.0 ft; blow counts 15-19-30-34.
130.00-133.55	Fine- to very fine-grained sand as above.
133.55-134.15	Brown (7.5YR 5/2) silty clay; laminated; with rare, small wood fragments.
134.15-135.00	Ibid., with few, thin interbeds of brown silty clay as above; convoluted bedding.
135.0-138.0	Rotary drilled; geophysical log indicates lithology as above.
138.0-140.0	Recovery 1.9/2.0; blow counts 11-13-24-33.
138.0-139.9	Complexly interbedded grayish brown (10YR 5/2) very fine-grained sand and thin beds of brown (7.5YR 5/2) silty clay. Fine-grained sand from 139.7-139.8 ft; Light brownish gray (10YR 6/2) silt loam from 139.3-139.4 ft.
139.9-140.0	Core loss.
140.0-143.0	Rotary drilled; geophysical log indicates lithology as above.
143.0-145.0	Recovery 2.0/2.0; blow counts 21-41-43-63.
143.0-143.2 ft, 143.8-144.3 ft, and 144.6-145.0 ft.	Stratified, light brownish gray (10YR 6/2) silt loam to very fine-grained sand and less fine-grained sand.
143.2-143.8 ft, 144.3-144.6 ft.	Stratified, brown (7.5YR 5/2) silty clay diamicton; calcareous.
145.0-148.0	Rotary drilled; geophysical log indicates lithology as above.
148.0-150.0	Recovery 2.1/2.0; blow counts 8-12-16-20.
148.0-149.1	Stratified, brown (7.5YR 5/2) silty clay loam diamicton.
149.1-149.3	Light grayish brown (10YR 6/2) silt; soft, easily liquifiable.
149.3-150.1	As above, with small pods of very fine-grained sand.
150.1-153.0	Rotary drilled; geophysical log indicates lithology as above.
153.0-155.0	Recovery 1.6/2.0 ft; blow counts 14-26-31-39.
153.0-154.6	As above, but only about 20% brown (7.5YR 5/2) silty clay; light grayish brown (10YR 6/2) silt contains common, rounded interclasts of brown (7.5YR 5/2) fine-grained sand; convoluted bedding and other soft sediment deformation structures (dish and pillow structures?).
153.6-155.0	Core loss.
155.0-158.0	Rotary drilled; geophysical log indicates lithology as above.
158.0-160.0	Recovery 2.0/2.0 ft; blow counts 22-37-60-85.
158.0-159.8	Stratified grayish brown (10YR 5/2) silt loam (lithology A) interbedded with brown (7.5YR 5/2) silty clay diamicton with small, rounded clasts of soft, brown (7.5YR 5/2) loam (lithology B); calcareous; silt loam makes up about 65%, and silty clay 35% of the lithology.
160.0-163.0	Rotary drilled; geophysical log indicates lithology as above.
163.0-165.0	Recovery 2.0/2.0 ft; blow counts 13-22-30-48.
163.0-163.6	Lithology B from above.
163.6-164.3	Lithology A from above.
164.3-165.0	Interbeds of lithology A and B.
165.0-168.0	Rotary drilled; geophysical log indicates lithology as above.
168.0-170.0	Recovery 2.0/2.0 ft; blow counts 16-11-14-18.
168.0-170.0	As above; one large dropstone (1.5 x 1.0 x 1.0 cm) at 169.0 ft.
170.0-173.0	Rotary drilled; geophysical log indicates lithology as above.
173.0-175.0	Recovery 2.0/2.0 ft; blow counts 18-21-35-120.
173.0-175.0	Most lithology B (brown [7.5YR 5/2] laminated silty clay)

with thin layers of brown (7.5YR 4/4) silty clay.

175.0-178.0 Rotary drilled; geophysical log indicates lithology as above.

178.0-180.0 Recovery 2.0/2.0 ft; blow counts 13-18-21-27.

178.0-179.0 Mostly lithology B (80%) from above with some thin interbeds of lithology A 20%.

179.0-179.2 Grayish brown (10YR 5/2) silt loam.

179.20-179.75 Ibid.

179.75-179.85 Brown (7.5YR 5/2) sandy loam diamicton.

179.85-180.0 Ibid.

180.0-183.0 Rotary drilled; geophysical log indicates lithologic change at 181.0 ft.

183.0-185.0 Recovery 1.6/2.0; blow counts 14-30-98-59.

183.0-183.3 Brown (7.5YR 5/2) loam diamicton

183.3-183.8 Silt; stratified with thin beds of fine-grained sand at base

183.8-184.0 Stratified loam diamicton with stringers of brown (7.5YR 5/2) clay.

184.0-184.6 Thin beds of brown (7.5YR 5/2) silty clay, well-sorted fine-grained sand, and loam diamicton; sharp contacts; bed thickness ranging from 0.05 to 0.01 ft.

184.6-185.0 Core loss.

185.0-188.0 Rotary drilled; geophysical log indicates lithology as above.

188.0-190.0 Recovery 0.9/2.0 ft; blow counts 32-60-85-112.

188.0-188.9 Brown (7.5YR 4/2) loam diamicton; uniform; calcareous.

188.9-190.0 Core loss.

190.0-193.0 Rotary drilled; geophysical log indicates lithology as above.

193.0-194.2 Recovery 1.2/1.2 ft; blow counts 40-70-100/3".

193.0-194.2 Brown (7.5YR 5/2) layers of silty clay, well-sorted medium-grained sand and coarse gravel.

194.2-198.0 Rotary drilled; geophysical log indicates that the layer of sand and gravel extends to about 195.0 ft.

198.0-199.0 Recovery 1.0/1.0 ft; blow counts 50-140.

198.0-199.0 Brown (7.5YR 5/2) loam diamicton; uniform; calcareous.

199.0-203.0 Rotary drilled; geophysical log indicates lithology as above.

203.0-203.7 Recovery 0.7/0.7 ft; blow counts 103-100/2".

203.0-203.7 As above.

203.7-208.0 Rotary drilled; geophysical log indicates lithology as above.

208.0-209.0 Recovery 1.0/1.0 ft; blow counts 60-115.

208.0-209.0 As above.

209.0-213.0 Rotary drilled; geophysical log indicates lithologic change at 209.0 ft..

213.0-213.7 Recovery 0.7/0.7 ft; blow counts 160-100/2".

213.0-213.7 Grayish brown (10YR 5/2) very-fine grained sand; stratified; calcareous.

213.7-218.0 Rotary drilled; geophysical log indicates lithology as above.

218.0-218.8 Recovery 0.8/0.8 ft; blow counts 115-100/3".

218.0-218.8 Very poorly sorted sand and gravel.

218.8-223.0 Rotary drilled; geophysical log indicates lithology as above.

223.0-223.9 Recovery 0.9/0.9 ft; blow counts 122-100/4".

223.0-223.9 As above, but with somewhat coarser clasts.

223.9-233.0 Rotary drilled; geophysical log indicates lithology as above.

233.0-234.5 Recovery 1.5/1.3 ft; blow counts 40-72-100/3".

233.0-234.5 Grayish brown (10YR 5/2) very well-sorted medium grained sand.

234.5-243.0 Rotary drilled; geophysical log indicates lithology as

above.

243.0-244.0 Recovery 0.9/1.0 ft; blow counts 30-150.
 243.0-244.0 Poorly sorted grayish brown (10YR 5/2) coarse-grained sand with small gravel; uniform; calcareous.
 244.0-248.0 Rotary drilled; geophysical log indicates lithology as above.
 248.0-249.5 Recovery 1.3/1.5 ft; blow counts 157-115-100.
 248.0-249.3 Dark grayish brown (2.5YR 4.5/2) very poorly sorted sand and gravel; uniform; calcareous.
 249.5-253.0 Rotary drilled; geophysical log indicates lithology as above.
 253.0-253.5 Recovery 0.5/0.5 ft; blow counts 250/6".
 253.0-253.5 Light olive brown (2.5Y 5/4) well-sorted, medium-grained sand; disturbed.
 253.5-258.0 Rotary drilled; geophysical log indicates lithology as above.
 258.0-259.2 Recovery 0.8/1.2 ft; blow counts 52-1-100/2".
 258.0-259.2 As above.
 259.2-263.0 Rotary drilled; geophysical log indicates lithology as above.
 263.0-263.6 Recovery 0.5/0.6 ft; blow counts 90-100/1".
 263.0-263.5 Light yellowish brown (2.5Y 6/4) well-sorted fine-grained sand; calcareous; uniform.
 263.6-268.0 Rotary drilled; geophysical log indicates lithology as above.
 268.0-268.5 Recovery 0.5/0.5 ft; blow counts 210/6".
 268.0-268.5 Pale olive (5Y 6/3) stratified, well-sorted, very fine-grained sand; calcareous.
 268.5-273.0 Rotary drilled; geophysical log indicates lithology as above.
 273.0-273.2 Recovery 0.2/0.2 ft; blow counts 200/2".
 273.0-273.2 Poorly sorted sand and gravel; one gravel fragment is >2" diameter.
 273.2-283.0 Rotary drilled; geophysical log indicates lithology as above.
 283.0-284.0 Recovery 0.9/1.0 ft; blow counts 125-200.
 283.0-283.5 Grayish brown (2.5Y 5/2) poorly sorted sand and gravel.
 283.5-284.0 Grayish brown (2.5Y 5/2) well-sorted, medium-grained sand.
 284.0-293.0 Rotary drilled; geophysical log indicates lithologic change at 291 ft.
 293.0-294.0 Recovery 1.0/1.0 ft; blow counts 63-165.
 293.0-294.0 Dark grayish brown (10YR 4/2) silty clay loam diamicton; uniform; calcareous.
 294.0-298.0 Rotary drilled; geophysical log indicates lithology as above.
 298.0-298.2 Recovery 0.2/0.2 ft; blow counts 200/2".
 298.0-298.2 Light brownish gray (10YR 6/2) sandy loam diamicton; abundant gravel; uniform; calcareous.
 298.2-308.0 Rotary drilled; geophysical log indicates lithologic change at 299.0 ft.
 308.0-308.3 Recovery 0.3/0.4 ft; blow counts 200/4".
 308.0-308.3 Light brownish gray (10YR 6/2) moderately well sorted, medium-grained sand.
 308.3-311.0 Rotary drilled; geophysical log indicates lithology as above.
 311.0-321.0 Changed to bedrock coring; Recovery 9.7/10.0 ft. Light gray (5Y 7/1) dolomite with thin, wavy, discontinuous beds of green shale; nodular chert from 313.0-314.0 ft.

Key to Appendix B

Particle—size determinations: gravel and sand content determined from wet sieving; medium silt, fine silt and clay contents determined by SediGraph; coarse silt and total silt content determined by combining analyses by SedGraph SediGraph and wet sieving

GR = gravel (> 2 mm), total sample
SD = sand (63 - 2000 μm ; < 2000 μm fraction)
ST = silt (4 - 16 μm ; < 2000 μm fraction)
CL = clay (< 4 μm ; < 2000 μm fraction)
MS/CS = medium silt-to-coarse silt ratio (16 - 32 μm /32 - 63 μm)
FS/MS = fine silt-to-medium silt ratio (4 - 16 μm /16 - 32 μm)
FC/CC = fine clay-to-coarse clay ratio (< 1 μm [1 - 4 μm])

Semi-quantitative clay mineralogy determined from X-ray diffractograms of oriented, ethylene glycol solvated aggregate samples

EXP = clay minerals that expand to 17Å
ILL = illite; K + C = kaolinite plus chlorite
CAL = calcite (counts per second); DOL = dolomite (counts per second)
VI = vermiculite index
HSI = heterogeneous swelling index
CPS = total counts per second

Boring MC-1

Depth (ft) UNIT	<2 mm fraction %				< 1 μm		MS/		FS/		FC/		Clay mineral content of the < 2 μm fraction						
	GR	SD	ST	CL			CS	MS	MS	CC	EXP	ILL	K+C	CAL	DOL	DI	VI	HSI	CPS
19.1 Ec	0.0	12.5	41.1	46.3	27.3	2.0	2.4	1.4	82	11	7	0	0	0	0	1.1	35	31	1320
20.3 Ec	0.2	22.3	45.4	32.3	13.4	2.2	2.4	0.7	39	39	22	35	12	19	8	460			
24.0 Ec	1.3	16.0	54.0	30.0	12.0	1.7	2.1	0.7	25	48	27	30	20	14	4	405			
24.4 Ec	0.0	31.4	50.4	18.2	10.2	1.1	0.8	1.3	20	56	24	23	45	12	2	1070			
26.3 Ec	0.0	4.8	57.4	37.8	19.8	4.1	1.5	1.1	22	56	22	16	36	17	10	0	1070		
27.6 Ec	0.0	4.6	56.5	39.0	20.1	3.1	1.7	1.1	17	58	25	15	68	16	10	0	1710		
30.5 Ec	0.0	21.4	62.6	15.9	9.8	1.0	0.7	1.6	24	53	23	15	37	16	13	2	1400		

Boring MC-3

Depth (ft) UNIT	<2 mm fraction %				< 1 μm		MS/		FS/		FC/		Clay mineral content of the < 2 μm fraction						
	GR	SD	ST	CL			CS	MS	MS	CC	EXP	ILL	K+C	CAL	DOL	DI	VI	HSI	CPS
4.6 Wt	4.5	45.0	29.4	25.6	17.5	1.4	1.4	2.2											
7.5 Wt	5.8	45.3	30.2	24.5	14.0	1.1	1.9	1.3	37	44	19	53	97	1.5	26	7	1150		
13.7 Wt	3.9	44.2	30.6	25.2	15.0	1.4	1.7	1.5											
16.0 Wt									18	56	26	78	90	1.5	10	3	1650		
21.1 Wa	29.1	86.0	14.0	*															
23.3 Wa	0.3	79.4	20.6	*															
23.8 Wa	7.2	92.7	7.3	*															
30.2 Wa	0.2	4.3	74.2	21.5	10.3	2.3	3.4	1.1	21	58	21	47	67	1.8	11	0	940		
31.8 Wa									23	53	24	43	58	1.5	9	5	705		

* clay percent is included with silt

Appendix B (cont.). Laboratory data; particle-size determinations done by Sedigraph and wet sieving.

Boring MC-4

Depth (ft) UNIT	<2 mm fraction %				< 1 μ m	MS/		FS/		FC/		Clay mineral content of the < 2 μ m fraction					
	GR	SD	ST	CL		CS	MS	CS	MS	CC	FC	EXP	ILL	K+C	CAL	DOL	DI
1.0 PC	16.8	91.2	8.8	*													
4.0 Wh												10	73	17	20	70	2.9
5.0 Wh	91.7	92.3	7.7	*													
5.2 Wh												11	73	16	20	80	3.0
22.0 Wh(z)	62.6	91.0	9.0	*													
58.8 Wh(z)	41.9	98.2	1.8	*													

Boring MC-5

Depth (ft) UNIT	<2 mm fraction %				< 1 μ m	MS/		FS/		FC/		Clay mineral content of the < 2 μ m fraction					
	GR	SD	ST	CL		CS	MS	CS	MS	CC	FC	EXP	ILL	K+C	CAL	DOL	DI
2.5 C												66	22	12	0	0	1.3
3.5 C												65	23	12	18	42	1.3
3.8 C	34.7	89.9	10.1	*													
4.4 C	15.8	96.5	3.5	*													
6.5 H												69	20	11	32	43	1.2
11.0 H												63	26	11	0	40	1.6
21.5 H	25.0	96.7	3.3	*													
26.5 H	7.0	98.1	1.9	*													
36.5 H	32.3	98.2	1.8	*													

* clay percent is included with silt

Boring MC-7

Depth (ft) UNIT	<2 mm fraction %				< 1 μm	MS/ CS	FS/ MS	FC/ CC	Clay mineral content of the < 2 μm fraction								
	GR	SD	ST	CL					EXP	ILL	K+C	CAL	DOL	DI	VI	HSI	CPS
1.3 R	3.5	24.3	44.2	31.5	23.0	3.4	1.2	2.7									
2.9 H(d)	31.2	75.8	18.0	6.2	3.7	1.0	1.2	1.5									
3.4 H(d)	9.3	42.4	44.9	12.6	5.7	1.5	1.2	0.8	19	58	23	59	87	1.7	10	3	980
4.3 H(d)	15.1	46.9	32.5	20.5	11.1	1.3	1.7	1.2	18	57	25	48	54	1.6	10	0	1470
8.5 Wt	13.3	47.7	31.7	20.6	12.1	1.2	1.4	1.4									
8.9 Wt	24.6	57.0	25.6	17.4	10.4	1.2	1.5	1.5	15	59	26	43	72	1.5	9	2	1170
10.5 Wt	2.6	32.9	33.0	34.1	21.6	1.5	1.8	1.7	17	58	25	42	71	1.6	8	0	1450
13.0 Wt	10.5	32.7	33.6	33.8	21.2	1.6	1.7	1.7	14	55	31	53	70	1.2	14	0	1420
18.3 Wt	2.6	33.2	33.6	33.2	21.1	1.4	1.6	1.7	15	62	23	73	83	1.8	11	X	1640
23.0 Wt	5.5	33.7	32.8	33.6	21.6	1.5	1.7	1.8	13	62	25	55	70	1.6	8	0	1510
25.9 Wa	65.9	86.6	13.4	*													
26.1 Wa	44.4	94.1	5.9	*													
34.0 Wa	59.4	93.5	6.5	*													
39.5 Wa	4.2	94.5	5.5	*													
44.0 Wa	29.0	94.6	5.4	*													
49.3 Wa	5.7	98.0	2.0	*													
49.8 Wa	17.6	96.3	3.7	*													
59.0 Wa	18.3	94.4	5.6	*													
68.4 Wa									20	60	20	50	65	2.0	5	0	950
68.5 Wa									20	54	26	46	58	1.4	9	1	610
79.0 Wa	7.2	93.2	6.8	*													
88.5 Wa									27	45	28	63	60	1.1	12	8	670
89.0 Wa	4.1	95.1	4.9	*													
99.0 Wa	3.6	93.6	6.4	*													
109.0 Elw	48.0	81.1	18.9	*													

* clay percent is included with silt

Appendix B (cont.). Laboratory data; particle-size determinations done by Sedigraph and wet sieving.

Boring MC-8

Depth (ft) UNIT	<2 mm fraction %					< 1 μ m		MS/ CS	FS/ MS		FC/ CC	Clay mineral content of the < 2 μ m fraction									
	GR	SD	ST	CL								EXP	ILL	K+C	CAL	DOL	DOL	DI	VI	HSI	CPS
2.4 Wt	3.6	36.3	32.4	31.3	19.7	1.3	1.8	1.7	1.7	1.7	1.7	15	70	15	20	72	72	3.1	12	3	1175
3.0 Wt												14	60	26	58	93	93	1.6	9	0	1240
14.6 Wt	4.0	36.4	32.9	30.7	19.2	1.4	1.6	1.7	1.7	1.7	1.7										
20.0 Wt	2.9	34.4	33.8	31.8	19.9	1.2	1.7	1.7	1.7	1.7	1.7										
25.0 Wt	1.9	33.9	33.6	32.5	20.6	1.8	1.6	1.7	1.7	1.7	1.7	13	66	21	72	100	100	2.1	6	0	1690
29.5 Wt	6.6	78.3	21.7	*																	
30.0 Wt	2.1	33.0	34.5	32.4	20.4	1.0	1.8	1.7	1.7	1.7	1.7										
35.0 Wt	3.3	33.2	35.2	31.6	19.6	1.5	1.5	1.6	1.6	1.6	1.6	14	63	23	50	64	64	1.8	7	0	1470
39.9 Wt	2.5	33.0	34.7	32.3	20.0	1.5	1.6	1.6	1.6	1.6	1.6	13	61	26	53	74	74	1.6	5	0	1230
45.0 Wt	2.6	37.9	36.2	25.9	15.5	1.6	1.6	1.5	1.5	1.5	1.5	14	60	26	53	74	74	1.5	7	2	1300
45.9 Wt	2.9	32.6	38.4	29.0	17.8	1.5	1.7	1.6	1.6	1.6	1.6	17	59	24	37	55	55	1.7	10		970
46.9 R	0.0	0.7	76.2	23.1	12.0	5.7	2.1	1.1	1.1	1.1	1.1	32	43	25	0	0	0	1.2	23	6	795
48.2 R	0.0	5.8	61.7	32.5	18.6	5.8	2.6	1.3	1.3	1.3	1.3										
48.7 R	0.0	7.8	61.6	30.6	16.7	5.8	2.4	1.2	1.2	1.2	1.2	29	38	33	0	0	0	0.8	36	7	1120
49.1 R	0.0	40.0	39.1	20.9	9.5	3.7	2.6	0.8	0.8	0.8	0.8	33	34	33	0	0	0	0.7	37	6	790
50.6 Pe(x)	1.7	54.9	21.7	23.4	14.1	1.7	2.1	1.5	1.5	1.5	1.5	25	38	37	0	0	0	0.7	25	0	710
51.4 Pe(x)	2.5	39.6	11.8	48.6	43.3	1.2	1.9	8.1	1.9	8.1	8.1	19	55	26	0	0	0	1.4	18		1210
52.9 Pe(x)	1.8	50.0	12.8	37.1	32.1	1.4	1.5	6.4	2.3	5.1	6.4	23	51	26	0	0	0	1.3	19		880
55.3 Pe(x)	10.0	63.8	12.4	23.7	19.2	0.9	1.3	4.3	2.7	5.3	4.3	27	53	20	0	0	0	1.8	22	0	1300
59.2 Pe(x)	8.0	61.8	27.3	10.9	6.2	0.9	1.2	1.3	1.8	6.2	1.3	18	62	20	28	32	32	2.1	9		1640
60.0 Pe(x)	10.2	89.6	10.4	*																	
62.0 Pe(x)	8.7	69.7	20.0	10.3	6.0	1.4	1.3	1.4	2.1	5.8	1.4	21	58	21	63	54	54	1.9	11	2	1940
74.0 Pe	81.0	80.1	19.9	*																	
78.2 Pe	85.2	93.1	6.9	*																	

* clay percent is included with silt

Boring MC-8 (cont.)

Depth (ft) UNIT	<2 mm fraction %				< 1 μm	MS/ CS	FS/ MS	FC/ CC	Clay mineral content of the < 2 μm fraction									
	GR	SD	ST	CL					CL	EXP	ILL	K+C	CAL	DOL	DI	VI	HSI	CPS
78.9 Pe	31.2	93.2	6.8	*														
93.5 Pe	32.7	94.9	5.1	*														
103.8 Pe	8.0	96.4	3.6	*														
113.9 Pe	0.9	94.6	5.4	*														
119.0 T	0.0	0.1	38.5	61.4	33.1	16.3	5.7	1.2	19	62	19	53	67	2.1	3	0	1585	
119.7 T	0.0	7.6	82.4	10.0	5.9	1.1	0.6	1.4										
123.6 T	0.1	61.4	38.6	*														
124.5 T									18	62	20	55	77	2.1	8	0	1800	
128.6 T	38.3	84.5	15.5	*														
129.8 T	5.7	42.2	39.0	18.8	9.6	1.4	1.7	1.0	25	54	21	53	39	1.7	8	8	950	
134.2 T	47.8	82.7	17.3	*														
144.4 Go	3.9	43.7	30.4	25.9	15.7	1.3	1.6	1.5	19	57	24	43	58	1.6	8	0	840	
148.1 Go	3.8	34.7	33.5	31.7	17.2	1.9	1.9	1.2	22	55	23	47	65	1.6	10	2	905	
153.1 Go	2.5	30.4	33.7	36.0	21.8	1.7	1.9	1.5	20	58	22	49	55	1.8	6	2	1090	
158.3 Go(z)	33.7	91.4	8.6	*														
163.2 Go	14.3	56.7	26.8	16.5	10.3	1.3	1.3	1.7	18	59	23	49	68	1.7	3	2	1020	
168.3 Go	37.5	45.9	34.4	19.7	10.9	1.6	1.4	1.2	17	58	25	53	70	1.6	8	3	930	
178.0 Go	14.0	52.3	30.5	17.2	7.8	1.4	1.2	0.8	20	54	26	62	74	1.4	9	1	805	
188.0 B(x)									40	34	26	0	0	0.9	29		700	
189.0 B(x)	23.0	38.8	12.5	48.8	45.3	1.1	1.1	13.1	35	40	25	0	0	1.1	26		1130	
191.1 B(x)									23	65	12	0	0	3.7	12		2040	

* clay percent is included with silt

Boring MC-9

Depth (ft) UNIT	<2 mm fraction %				< 1 μm	MS/ CS	FS/ MS	FC/ CC	Clay mineral content of the < 2 μm fraction									
	GR	SD	ST	CL					EXP	ILL	K+C	CAL	DOL	DI	VI	HSI	CPS	
16.1 Wy										14	73	13	48	93	3.8	-1		1940
17.0 Wy	11.6	29.9	34.9	35.3	21.9	1.9	2.0	1.6		8	72	20	47	75	2.4	-13		1970
19.1 Wy	10.1	9.0	41.0	50.0	31.7	2.4	2.2	1.7		7	72	21	40	58	2.3	-10		2110
28.1 Wy	1.0	4.5	28.8	66.7	42.0	3.7	4.6	1.7		6	70	24	51	63	1.9	6	0	1640
32.0 Wt	14.7	26.5	47.6	25.9	14.4	2.0	1.5	1.2		14	61	25	59	86	1.6	4	0	1340
32.0 Wt(z)	50.8	78.8	21.2	*														
35.9 Wt	17.1	30.7	41.0	28.3	16.5	2.0	1.8	1.4		12	65	23	42	68	1.9	4	0	1300
39.6 Wt(f)	0.0	1.0	5.1	93.9	49.9	0.0		1.1		13	65	22	57	78	2.0	-2	2	1750
43.5 Wt(f)	0.0	0.2	34.9	64.9	41.4	8.0	4.3	1.8		12	66	22	56	77	2.0	0	X	1830
46.0 Wt(f)	0.0	0.3	64.9	34.8	16.9	26.6	8.2	0.9		15	63	22	65	92	1.9	-3	4	2050
50.0 Wt(f)	0.0	0.3	84.6	15.1	5.7	12.2	3.5	0.6										
54.3 Wt(f)	1.6	24.0	55.7	20.3	12.2	2.5	1.2	1.5										
56.1 Wt(f)										11	65	24	53	73	1.8	2	2	1300
59.0 Wt(f)										13	62	25	42	78	1.9	8	0	1020
65.4 Wt(z)	42.4	81.2	18.8	*														
65.8 Wt	19.9	30.7	35.7	33.6						18	57	25	57	70	1.6	12	0	1410
72.5 Wt	2.3	32.9	32.4	34.8	23.9	1.4	2.0	2.2		17	57	26	58	69	1.5	11	0	1100
77.5 Wt	6.6	40.7	27.5	31.9		1.4	1.9	1.6		15	60	25	54	85	1.6	8	2	1335
81.8 Wt(z)	4.9	83.2	16.8	*														
83.5 Wt	5.6	33.5	31.6	34.8		1.4	1.7	1.9		15	61	24	44	76	1.7	9	0	980
93.0 Wt	5.0	36.1	33.0	30.9	19.1	1.5	1.5	1.6		14	59	27	56	68	1.5	8	0	960
103.0 Wt	28.8	35.9	32.3	31.7	19.7	1.6	1.8	1.6		17	59	24	43	62	1.6	9	2	910
123.0 Wt										14	60	26	43	66	1.5	4	0	1000
133.0 Wt										11	63	26	57	63	1.6	4	0	910
143.3 Wt	4.0	37.8	33.1	29.1	19.0	1.3	1.4	1.9		11	65	24	51	78	1.8	-3	0	1150

* clay percent is included with silt

Boring MC-9 (cont.)

Depth (ft) UNIT	<2 mm fraction %				< 1 μm	MS/ CS	FS/ MS	FC/ CC	Clay mineral content of the < 2 μm fraction								
	GR	SD	ST	CL					EXP	ILL	K+C	CAL	DOL	DI	VI	HSI	CPS
153.0 Wt	14.2	39.6	32.7	27.7	17.8	1.5	1.5	1.8	12	65	23	52	85	1.9	0	0	1290
163.1 Wt	6.7	33.6	32.2	34.1	21.0	1.8	2.0	1.6	12	63	25	57	84	1.7	3	0	1290
173.0 Wt	19.0	30.9	30.2	38.9	23.7	2.8	2.7	1.6	15	65	20	70	105	2.1	4	2	1570
183.0 Wt	6.4	37.7	38.2	24.2	13.6	1.3	1.2	1.3	13	61	26	100	90	1.6	8	0	1780
193.1 Wa	4.9	48.2	51.8	*													
193.6 Wa	31.0	91.8	8.2	*													

Boring MC-10

Depth (ft) UNIT	<2 mm fraction %					< 1 μm	MS/ CS	FS/ MS	FC/ CC	Clay mineral content of the < 2 μm fraction									
	GR	SD	ST	CL	CL					EXP	ILL	K+C	CAL	DOL	DI	VI	HSI	CPS	
1.5 P	0.0	7.7	44.8	47.5	37.9	4.5	1.4	3.9	59	28	13	0	0	1.5	39	9	2340		
3.0 Go	1.5	52.5	19.3	28.2	22.5	1.7	1.5	3.9	44	44	12	0	0	2.5	27	6	1350		
9.5 Go	4.4	47.8	30.5	21.7	13.5	1.2	1.5	1.7	41	45	14	52	92	2.2	25	8	1330		
15.0 Go	3.6	31.4	27.5	41.1	28.0	1.5	2.0	2.1	29	56	15	88	83	2.4	11	9	1180		
17.9 Go	3.4	35.6	28.9	35.5		1.7	1.8	1.8	23	61	16	85	74	2.7	11	5	1710		
18.1 Go	10.6	54.7	29.3	16.0	9.7	1.2	1.2	1.5	29	55	16	50	90	2.2	16	5	1190		
24.3 Go									38	47	15	55	74	2.0	14	11	1340		
25.0 Go	12.6	46.1	35.3	18.6	10.5	1.4	1.6	1.3	33	51	16	83	123	2.2	19	10	1410		
29.0 Go	15.7	49.4	33.2	17.4	10.3	1.4	1.5	1.4	34	53	13	60	101	2.7	15	8	1070		
33.6 Go(z)	0.0	98.2	1.8	*															
34.3 Go(z)	0.4	98.4	1.6	*															
34.7 Go(z)	28.1	98.2	1.8	*															
38.8 Go	2.0	48.3	39.1	12.6	6.8	1.2	1.1	1.2	27	52	21	40	52	1.6	13	3	750		
41.5 Go	5.4	58.2	25.7	16.0	9.7	1.1	1.5	1.5	24	58	18	67	87	2.1	15	6	880		
42.0 Go	12.7	57.1	26.3	16.7	9.5	1.3	1.6	1.3	16	59	25	55	72	1.6	7	0	1280		

Boring MC-10 (cont.)

Depth (ft)	UNIT	<2 mm fraction %					MS/ μ m	CS	FS/ MS	FC/ CC	Clay mineral content of the < 2 μ m fraction										CPS	
		GR	SD	ST	CL	*					EXP	ILL	K+C	CAL	DOL	DI	VI	HSI				
43.5 Go(z)		2.1	91.0	9.0	*																	
48.0 Go		14.1	51.2	29.1	19.8			1.6	1.4	1.5		19		56	25	52	90	1.5	8		2	1220
53.0 Go		11.6	58.4	24.0	17.6	11.5		1.3	1.4	1.9		22		56	22	65	94	1.6	8		2	1250
58.0 Go		8.6	56.7	25.9	17.3	11.0		1.0	1.5	1.8		21		55	24	20	90	1.5	13			1480
63.0 Go		12.0	60.2	23.3	16.4	10.6		1.2	1.5	1.8		20		57	23	75	105	1.7	9			1840
68.0 Go		11.1	56.0	27.3	16.8	11.1		1.4	1.7	1.9		16		59	25	39	48	1.6	2	3		810
73.0 Go		33.3	32.4	40.4	27.2			1.4	1.6	1.4		11		68	21	60	65	2.7	-2			1670
84.0 Go		8.8	59.9	26.8	13.3			1.5	1.5	1.3		12		64	24	54	73	1.8	0			1310
89.7 Gf		7.9	50.5	21.3	28.2	21.8		1.0	1.1	3.4		11		71	18	45	73	2.7	-3			1690
89.7 Gf		7.7	52.0	27.1	20.9	13.0		1.4	1.8	1.6												
93.0 Gf		2.6	39.5	37.2	23.3			1.7	1.6	1.5		12		64	24	55	78	1.7	-1			1460
98.5 Gf		10.4	49.7	21.3	29.0	22.3		1.0	1.2	3.4		9		67	24	62	67	1.9	-2			1430
103.0 Gf		19.0	47.3	22.6	30.1	22.7		1.2	1.2	3.1		11		67	22	45	60	2.0	-2			1520
108.0 Gf		7.1	48.2	29.9	21.8			1.6	1.6	1.6		7		66	27	57	90	1.7	-5			1130
118.0 Gk		15.6	37.3	36.3	26.4			1.8	1.8	1.6		20		60	20	53	79	2.0	5	4		1300
128.0 Gk		9.2	38.9	21.3	39.8	30.5		2.3	1.6	3.2		24		55	21	52	68	1.7	6	6		1420
138.0 Gk		10.1	36.0	26.5	37.5	29.0		1.3	1.1	3.4		21		58	21	57	75	1.8	7	4		170
138.0 Gk		18.9	35.1	38.5	26.4	16.2		1.7	1.6	1.6												
148.0 Gk		24.7	27.7	30.5	41.8	32.2		1.1	1.1	3.4		28		55	17	60	65	2.1	19	8		1810
158.0 Gk		1.8	51.4	25.8	22.8	15.5		1.1	1.3	2.1		41		36	23	38	53	1.1	22	10		1480
168.0 Gk		5.1	40.8	24.5	34.7	27.8		1.4	1.2	4.0		49		34	17	28	27	1.3	31	14		2560
178.0 Gk												37		42	21	53	30	1.4	20	4		1070
178.5 Gk(z)		43.6	88.5	11.5	*																	
188.0 Gk												40		41	19	0	0	1.5	26	5		2530
189.4 Gk(z)		57.1	81.1	18.9	*																	
198.0 B		8.0	46.9	23.7	29.4	22.7		1.1	1.1	3.4		15		66	19	44	0	2.4	-2	2		3630

* clay percent is included with silt

Boring MC-11

Depth (ft) UNIT	<2 mm fraction %				MS/ μm	CS	FS/ MS	FC/ CC	Clay mineral content of the < 2 μm fraction								
	GR	SD	ST	CL					EXP	ILL	K+C	CAL	DOL	DI	VI	HSI	CPS
0.0 Fill	92.6	87.3	12.7	*													
3.0 R	0.0	19.3	40.0	40.7	33.9	1.7	1.1	5.0	47	38	15	0	0	1.8	24	8	1100
5.5 H	60.0	84.0	16.0	*													
7.7 H(d)	0.0	13.5	46.5	40.0	31.2	1.8	1.1	4.7	48	40	12	0	0	2.1	22	9	680
20.5 H	62.2	90.8	9.2	*													
23.4 Wy	3.5	13.6	39.2	47.2	28.9	0.4	2.7	1.6	8	71	21	40	59	2.3	-3		1900
24.9 Wy	2.1	16.0	44.9	39.1	24.0	2.4	2.1	1.6	8	60	32	37	49	1.8	-6		1250
28.4 Wt	6.6	41.4	37.9	20.7	12.1	1.9	1.5	1.4	11	68	21	42	62	2.1	-5		1780
30.0 Wt	8.3	38.3	35.3	26.4	16.5	1.3	1.7	1.7	13	62	25	40	62	1.6	1		1185
40.0 Wt	14.0	45.3	38.3	16.4	9.1	1.9	1.5	1.2	10	60	30	35	80	1.4	-3		1240
43.0 Wt									14	59	27	40	62	1.5	3		860
48.0 Wt	5.5	30.3	37.0	32.7	20.3	1.5	2.0	1.6	14	62	24	43	65	1.3	3		1680
53.0 Wt									17	60	23	42	64	1.8	7		1440
58.0 Wt	3.0	33.2	37.6	29.2	18.7	1.2	1.6	1.8	19	58	23	42	69	1.7	11		1300
63.0 Wt									18	59	23	51	61	1.7	10		1380
68.0 Wt	2.6	33.9	35.0	31.1	20.3	1.3	1.6	1.9	16	64	20	43	64	2.1	11		1080
73.0 Wt									20	56	24	55	64	1.6	13		1010
78.0 Wt	3.5	34.0	34.2	31.8	20.6	1.4	1.6	1.9	18	59	23	55	70	1.7	9	0	1120
83.0 Wt									16	57	27	56	70	1.4	10	0	1100
88.0 Wt	8.0	33.8	34.5	31.7	20.5	1.3	1.7	1.8	18	59	23	47	67	1.7	12	0	1120
93.0 Wt									18	58	24	67	80	1.6	10	4	1150
98.0 Wt	4.7	34.3	33.0	32.7	20.9	1.0	2.2	1.8	18	59	23	60	85	1.7	12	0	1380
108.0 Wt	4.9	33.2	32.8	34.0	22.4	1.4	1.7	1.9	15	64	21	55	65	2.1	3	3	1070
115.0 Wt									16	59	25	55	80	1.6	7	4	1220
123.0 Wt	7.6	32.0	33.3	34.6	22.8	1.5	1.6	1.9	20	57	23	50	60	1.6	12	1	1110
133.0 Wt	3.6	31.3	33.9	34.8	23.6	1.5	1.6	2.1	19	56	25	52	65	1.5	15	0	1130

* clay percent is included with silt

Boring MC-11 (cont.)

Depth (ft) UNIT	<2 mm fraction %					< 1 μ m	MS/		FS/		FC/		Clay mineral content of the < 2 μ m fraction						
	GR	SD	ST	CL			CS	MS	CS	CC	EXP	ILL	K+C	CAL	DOL	DI	VI	HSI	CPS
138.0 Wt	7.7	31.6	36.1	32.3	20.0	1.3	1.7	1.6	1.6	23	53	24	54	66	1.5	13	2	1180	
148.0 Wt	11.8	32.2	35.0	32.8	19.8	1.5	1.9	1.5	1.5	18	59	23	41	65	1.7	10	0	1220	
163.4 Go	5.4	35.1	33.4	31.5	19.5	1.5	1.5	1.6	1.6	16	60	24	43	52	1.7	5	0	1200	
168.0 Go	10.8	38.7	31.9	29.5	19.8	1.2	1.6	2.0	1.6	16	61	23	56	90	1.8	7	1	1220	
178.0 Go	13.2	31.3	37.5	31.2	19.2	1.4	1.8	1.6	1.6	12	61	27	60	103	1.5	3		1240	
188.0 Go	3.4	37.6	32.5	29.9	18.7	1.5	1.7	1.7	1.7	13	64	23	57	88	1.9	2		1320	
198.0 Go	4.1	41.7	33.0	25.3	15.4	1.4	1.6	1.6	1.6	12	65	23	95	58	1.9	3	1	1330	
208.0 Go	2.9	42.4	35.0	22.6	14.9	1.0	1.3	1.9	1.9	16	57	27	60	135	1.4	4		1160	
218.5 Go	5.9	38.7	28.5	32.9	21.1	2.3	2.0	1.8	1.8	11	63	26	65	95	1.6	5		1480	

Boring MC-12

Depth (ft) UNIT	<2 mm fraction %					< 1 μm	MS/		FS/		FC/		Clay mineral content of the < 2 μm fraction							
	GR	SD	ST	CL			CS	MS	CC	EXP	ILL	K+C	CAL	DOL	DI	VI	HSI	CPS		
3.0 PC	5.4	27.6	46.3	26.1	18.4	1.0	0.8	2.4	51	34	15	0	0	1.5	34	6	1410			
6.4 Wt	5.3	37.6	34.9	27.5	16.1	0.9	2.1	1.4	22	65	13	20	48	3.3	13	8	1520			
11.5 Wt									22	63	15	58	82	2.8	16	8	1380			
12.5 Wt	11.8	39.6	35.2	25.2	13.8	1.7	1.8	1.2	19	62	19	57	83	2.2	15	2	1490			
14.0 Wt									16	61	23	58	80	1.8	9	0	1470			
15.3 Wt									17	61	22	48	83	1.9	7	0	1660			
18.3 Wt	6.9	31.6	37.2	31.1	13.0	1.4	2.5	0.7												
19.5 Wt	5.9	39.2	35.6	25.2	13.6	1.3	1.9	1.2	23	53	24	50	58	1.5	16	0	1080			
25.0 Wt	9.3	40.8	34.5	24.6	13.1	1.7	1.9	1.1	16	59	25	48	56	1.6	8	0	1210			
29.5 Wt	28.3	35.7	38.5	25.8	14.2	1.6	1.7	1.2	18	59	23	53	64	1.7	10	0	1640			
29.7 Wt(z)	50.3	91.5	8.5	*																
35.0 Wt	10.1	40.7	35.0	24.3	13.5	1.7	1.7	1.2	18	60	22	50	88	1.8	12		1610			

Boring MC-12 (cont.)

Depth (ft)	UNIT	<2 mm fraction %					< 1 μm	MS/ CS	FS/ MS	FC/ CC	Clay mineral content of the < 2 μm fraction							
		GR	SD	ST	CL						EXP	ILL	K+C	CAL	DOL	DI	VI	HSI
39.3 Wt(z)		11.9	96.4	3.6	*													
41.8 Wt(z)		90.8	91.4	8.6	*													
43.2 Wt																		
45.0 Wt		11.2	42.5	35.8	21.7	13.7	1.1	1.7	1.7	1.7	32	52	16	62	85	2.2	23	8 1260
49.9 Wt		6.7	43.9	37.7	18.4	10.5	1.0	1.6	1.3	1.3	12	62	26	66	97	1.6	10	1 1850
55.0 Wt		4.0	41.3	37.3	21.4	12.6	1.2	1.7	1.4	1.4	11	63	26	81	92	1.6	9	0 1530
65.0 Wt		10.4	33.5	39.7	26.8	16.4	1.0	1.8	1.6	1.6	9	69	22	68	102	2.0	-2	0 1960
70.0 Wt		18.7	41.6	33.2	25.2	15.8	1.4	1.6	1.7	1.7	13	64	23	65	77	1.8	7	4 1650
75.0 Wt		5.1	37.7	37.4	24.9	15.3	1.4	1.6	1.6	1.6	12	62	26	57	77	1.6	6	1740
83.4 Wa		72.5	83.4	16.6	*													
84.0 Wa		42.1	90.2	9.8	*													
88.5 Wa		23.0	92.5	7.5	*													
93.5 Wa		21.8	92.9	7.1	*													
98.8 Wa		57.3	87.4	12.6	*													
103.1 R		0.0	1.5	36.8	61.7	37.6	5.7	3.0	1.6	1.6								
108.0 Go		13.2	47.7	34.3	18.0	10.6	1.1	1.3	1.5	1.5	20	60	20	27	55	2.0	12	1790
109.0 Go		10.3	47.4	31.3	21.3	13.9	1.2	1.4	1.9	1.9	16	65	19	30	68	2.2	7	0 1455
110.0 Go		2.6	48.6	31.7	19.7	12.6	0.9	1.5	1.8	1.8	17	63	20	28	45	2.0	11	0 900
113.5 Go(z)		23.3	90.0	10.0	*													
118.5 Go(z)		0.0	84.3	15.7	*													
119.3 Go(z)		0.0	93.6	6.4	*													
123.3 Go(z)		34.2	90.9	9.1	*													
123.8 Go(z)		1.7	94.4	5.6	*													
133.3 Go		2.7	19.1	35.0	46.0	27.6	2.4	2.7	1.5	1.5	13	66	21	73	83	2.2	5	0 1940
134.0 Go											15	62	23	57	84	1.8	5	4 1760
145.5 Go		8.3	45.2	29.7	25.1	14.4	1.4	1.9	1.3	1.3	16	58	26	60	75	1.5	6	3 1535

* clay percent is included with silt

Appendix B (cont.). Laboratory data; particle-size determinations done by Sedigraph and wet sieving.

Boring MC-12 (cont.)

Depth (ft) UNIT	<2 mm fraction %					< 1 μ m	MS/		FS/	FC/		Clay mineral content of the < 2 μ m fraction							
	GR	SD	ST	CL	CL		CS	MS		CC	EXP	ILL	K+C	CAL	DOL	DI	VI	HSI	CPS
149.5 Go	3.1	35.5	32.7	31.8	19.7	1.4	2.0	1.6	1.6	12	64	24	50	65	1.8	1		2310	
155.0 Go	2.6	25.3	31.9	42.8	25.0	1.9	3.0	1.4	1.4	21	56	23	65	80	1.6	10	1	1720	
158.5 Go	4.6	36.3	32.2	31.5	18.4	1.6	2.3	1.4	1.4	8	56	36	47	63	1.6	-5	0	2950	
163.0 Go	3.0	33.9	31.7	34.4	21.0	1.5	2.3	1.6	1.6	10	68	22	56	68	2.0	-5		3020	
168.0 Gf	6.6	42.3	34.4	23.3	13.6	1.4	1.6	1.4	1.4	8	68	24	73	100	1.9	-5	1	2340	
169.5 Gf	8.4	5.3	48.5	46.2	29.0	2.0	2.0	1.7	1.7	15	63	22	32	35	1.9	-6	0	1150	
174.8 Gf	10.4	53.2	26.4	20.4	12.9	1.1	1.4	1.7	1.7	14	65	21	85	125	2.1	3		1620	
178.0 Gf										16	67	17	47	213	2.6	2	0	760	
178.8 Gf	11.3	53.2	25.8	21.1	13.9	1.1	1.3	2.0	2.0	12	68	20	85	100	2.2	0		1780	
183.0 Gf	17.5	48.2	29.8	22.0	12.5	1.2	1.7	1.3	1.3	8	72	20	45	150	2.4	-4	0	1800	

Boring MC-13

Depth (ft) UNIT	<2 mm fraction %					< 1 μm	MS/		FS/	FC/		Clay mineral content of the < 2 μm fraction						
	GR	SD	ST	CL	CL		CS	MS		CC	EXP	ILL	K+C	CAL	DOL	DI	VI	HSI
2.7 Wh	0.8	20.3	40.7	39.0	33.3	3.4	1.8	5.9	5.9	38	46	16	0	0	2.0	30	2	1680
4.5 Wh	30.1	51.3	36.1	12.6	9.3	5.7	1.5	1.8	1.8	18	64	18	25	84	2.3	14	2	1560
10.2 Wh	1.6	44.7	36.2	19.1	17.2	0.0	45.8	1.8	1.8	21	62	17	67	80	2.4	15	5	1560
12.6 Wh(z)	24.1	97.0	3.0	*														
13.7 Wh										20	60	20	90	105	2.0	17	3	1400
15.6 Wh	16.7	50.6	34.7	14.7	7.6	3.6	1.7	1.1	1.1	17	62	21	55	87	2.0	13	2	1200
20.0 Wh	14.7	40.9	31.6	27.5	17.5	0.9	2.5	1.8	1.8	14	65	21	46	70	2.1	11	0	1520
25.5 Wh	28.0	26.1	37.7	36.2	21.6	3.1	2.9	1.5	1.5	18	61	21	75	73	1.9	12	4	1230
28.1 Wh(z)	53.1	79.7	20.3	*														
33.9 Wh(z)	0.4	98.5	1.5	*														
39.1 Wh(z)	34.2	96.8	3.2	*														

* clay percent is included with silt

Boring MC-13 (cont.)

Depth (ft)	UNIT	<2 mm fraction %					< 1 μm	MS/ CS	FS/ MS	FC/ CC	Clay mineral content of the < 2 μm fraction									
		GR	SD	ST	CL						EXP	ILL	K+C	CAL	DOL	DI	VI	HSI	CPS	
44.0	Wh(z)	11.2	95.0	5.0	*															
54.1	Wh(z)	0.0	97.2	2.8	*															
54.9	Wh(z)	72.5	94.1	5.9	*															
64.1	Wh(z)	0.0	85.4	14.6	*															
74.1	Wh(z)	0.1	89.2	10.8	*															
83.2	Wt(f)	0.0	43.8	56.2	*															
83.2	Wt(f)	0.0	48.3	44.3	7.4	5.3	0.4	0.6	2.5											
84.2	Wt(f)									6	69	25	47	74	1.8	-11	0	2650		
84.3	Wt(f)									12	65	23	61	63	1.9	3	0	1930		
104.6	Wt(f)	0.2	23.1	63.4	13.4	6.3	0.3	1.1	0.8	16	58	26	61	63	1.5	13	0	1910		
106.5	Wt(f)	0.0	45.6	54.4	*					12	61	27	65	63	1.5	3	1	1870		
114.7	Wt(f)	0.0	16.8	71.5	11.7	7.3	2.6	0.6	1.7	15	61	24	64	83	1.7	2	4	1880		
124.0	Wt(f)	0.2	9.1	73.2	17.7	14.6	0.9	1.1	4.6	13	65	22	48	70	1.9	2	3	1610		
128.8	Wt(f)									16	63	21	65	72	2.0	6	2	2050		
133.6	Wt(f)									12	66	22	65	66	2.0	5	0	1960		
139.9	Wt(f)	2.4	15.3	57.4	27.4	15.2	2.1	0.8	1.3	14	63	23	57	58	1.8	4	1	1900		
143.1	Wt(f)	1.5	21.9	66.1	12.1	8.8	1.1	0.5	2.7											
143.3	Wt(f)	0.0	3.5	51.9	44.6	29.2	4.1	1.2	1.9	14	61	25	68	70	1.6	5	4	1730		
149.9	Wt(f)	5.4	16.2	45.7	38.1	24.8	2.0	1.3	1.9	12	60	28	67	81	1.4	4	0	1690		
159.8	Wt(f)	0.5	10.0	72.9	17.1	11.7	1.3	0.8	2.2	17	59	24	51	74	1.6	10	0	1840		
163.2	Wt(f)	0.7	4.1	50.1	45.8	31.7	2.7	1.5	2.3											
163.8	Wt(f)	2.1	9.2	80.1	10.7	6.5	5.3	0.7	1.5	20	59	21	48	58	1.8	12	X	1590		
168.0	Wt(f)									13	62	25	56	70	1.7	3	2	1665		
178.8	Wt	4.2	41.2	39.6	19.2	12.1	1.1	1.2	1.7	15	63	22	60	84	1.9	7	0	2110		
180.0	Wt(f)	5.5	5.6	15.9	78.4	53.2	2.1	4.3	2.1	14	61	25	81	80	1.6	4	0	2010		
188.8	Wt	5.6	43.5	29.6	26.8	15.7	1.2	2.3	1.4	17	60	23	60	84	1.8	9	X	1750		

* clay percent is included with silt

Boring MC-13 (cont.)

Depth (ft) UNIT	<2 mm fraction %					< 1 μm	MS/		FS/		FC/		Clay mineral content of the < 2 μm fraction							
	GR	SD	ST	CL			CS	MS	CC	EXP	ILL	K+C	CAL	DOL	DI	VI	HSI	CPS		
198.1 Wt	2.7	26.7	33.1	40.2	26.6	2.1	1.9	1.9	1.9	10	66	24	77	92	1.8	3	0	2000		
203.8 Wt	3.4	36.8	33.7	29.5	18.9	1.4	1.5	1.8	1.8	16	61	23	40	81	1.8	3	X	1480		
209.0 Wt	6.5	35.8	40.2	24.0	9.6	2.5	1.8	0.7	15	64	21	52	93	93	2.1	7	0	1640		
218.3 Wa	49.4	91.4	8.6	*																
223.3 Wa	78.9	87.3	12.7	*																
233.2 Wa	0.0	93.2	6.8	*																
243.3 Wa	5.9	93.6	6.4	*																
248.5 Wa	54.4	82.8	17.2	*																
253.4 Wa	0.5	92.9	7.1	*																
258.4 Wa	0.0	94.0	6.0	*																
263.3 Wa	0.1	89.0	11.0	*																
268.3 Wa	0.0	43.7	56.3	*																
273.1 Wa	51.2	55.7	27.6	16.7	8.8	1.9	1.9	1.1												
283.2 Wa	28.6	80.9	12.3	6.8	4.1	1.0	1.4	1.5												
283.8 Wa	0.7	93.9	6.1	*																
293.1 G	0.1	2.3	38.2	59.4	35.9	1.6	13.1	1.5	16	62	22	78	100	100	1.9	3	1	1600		
298.1 G	17.5	54.9	28.0	17.1	10.0	0.8	1.6	1.4	20	60	20	58	180	180	2.0	3	4	895		
308.1 G	1.5	86.4	9.8	3.8	2.5	0.6	0.9	1.9												

Boring NIPC-1

Depth		<2 mm fraction %				Clay mineral content of the < 2 μm fraction							Blow	Moist.
(ft)	UNIT	GR	SD	ST	CL	EXP	ILL	K+C	CAL	DOL	DI	VI	Cnts	cont
5.0	WIa	1	48	30	22	43	42	15	9		1.9	7	8	73
10.0	WIa	5	43	37	20	33	54	13	52	82	3	25	14	12.2
15.0	WIa	6	40	39	21	57	32	11	30	90	2	36	32	
15.1	WIa	2	17	68	15									
20.0	WIa	9	59	37	4	20	66	15	36	84	3.1	11	41	10.8
25.0	WIa	7	44	50	6	20	63	18	51	84	2.4	10.5	59	
30.0	WIa	30	69	24	7	34	53	13	71	78	3	18	140	
35.0	WIa		63	36	1	23	63	14	49	88	2.95	11	60	
40.0	WIa					10	68	23	61	75	2	-1	50	
45.0	WIa	6	46	33	21	9	67	24	74	115	1.8	-2	175	7.7
50.0	WIa													
52.5	WIa	29	60	29	11	10	66	24	61	108	1.8	0	100	
55.0	WIa	15	49	39	12	8	69	24	61	88	1.9	-6	116	
55.1	WIa	32	44	32	24									
60.0	WIa	9	46	29	25	9	70	22	50	85	2.1	-4	104	
65.0	WIa					9	71	21	39	88	2.3	-4	118	
70.0	WIa	9	49	32	19	5	74	21	47	72	2.3	-12	150	9.3
75.0	WIa	17	34	34	32	7	72	22	42	76	2.25	-6	200	9.8
75.1	WIa	9	46	37	17									
80.0	WIa	3	31	50	19	5	72	24	52	88	2	-11	200	10.3
85.0	WIa	13	40	34	26	8	71	22	62	74	2.2	-6	118	8.2
85.1	WIa	6	30	51	19									
90.0	WIa(z)					21	56	23	25	35	1.6	8.5	35	
95.0	WIa(z)								22	63	1.8	3	200	
100.0	WIa(z)					11	66	23	34	58	1.9	0	155	
105.0	WIa(z)	51	64	29	7									
115.0	WIa	3	31	37	32	6	74	20	55	55	2.4	-15		
120.0	WIa		54	27	19	5	73	23	53	63	2.15	-14	104	8
120.1	WIa	1	42	34	24									
125.0	WIa(f)	23	15	43	42	7	70	23	55	65	2	-8	134	19.4
125.1	WIa(f)	0	1	66	33									
130.0	WIa(f)	0	0	64	36	7	72	22	51	60	2.29	-6.5	137	16.6
135.0	WIa(f)	0	0	69	31	7	70	24	52	72	1.95	-10	76	10.3
140.0	WIa(f)	0	0	61	39	8	70	23	51	65	2.08	-8	85	19.1
145.0	WIa(f)	0	0	29	71	7	71	23	65	74	2.09	-12	81	18.6
145.1	WIa(f)	0	0	51	49									
150.0	WIa(f)	0	0	48	52	8	70	22	63	78	2.13	-9	87	17.3
155.0	WIa(f)	0	0	44	56	8	71	21	63	70	2.23	-9	90	36
155.1	WIa(f)	0	0	36	64									

Appendix B (cont.). Laboratory data; particle-size determinations done by hydrometer and wet sieving.

Boring NIPC-1 (cont.)

Depth		<2 mm fraction %				Clay mineral content of the < 2 μ m fraction						Blow	Moist.	
(ft)	UNIT	GR	SD	ST	CL	EXP	ILL	K+C	CAL	DOL	DI	VI	Cnts	cont
160.0	WIa(f)	0	0	53	47	6	71	23	57	80	2.05	−13		20.6
165.0	WIa(f)	0	0	53	47	6	72	23	67	79	2.09	−11	77	
165.1	WIa(f)	0	1	81	18									
170.0	WIa(f)	0	0	47	53	7	70	23	46	85	2.04	−3	88	19.8
170.1	Gb(?)	2	19	47	39									
175.0	Gb(?)	3	19	59	22	5	72	24	43	72	2.04	−13	97	21
175.1	Gb(?)	3	14	72	14									
180.0	Gb(?)	9	52	23	25	6	70	24	58	65	1.97	−8.5	75	9.7
180.1	Gb(?)	7	37	43	20									
188.0	Gb(?)	7	43	45	12	8	70	23	47	71	2.06	−7	117	10.6
190.0	Gb(?)	9	55	31	14	5	72	24	47	80	2.25	−8.5		
195.0	Gb(?)	3	32	36	32	7	71	22	67	70	2.18	−5	115	9.7
200.0	Gb(?)	13	32	33	35	9	71	21	64	75	2.21	−7.5	30	
205.0	Gb(?)	4	33	33	34	7	73	21	60	63	2.28	−18		10.6
210.0	Gb(?)	5	30	40	30	5	75	20	59	71	2.49	−16		13.8
215.0	Gb(?)	10	49	30	21	8	70	22	59	69	2.16	−7	162	9.8
215.1	Gb(?)	11	58	30	12									
220.0	Gb(l)	0	7	46	47	19	57	24	71	85	1.04	13	210	13.8
225.0	Gb(l)	0	15	56	29				35	84		10	191	
225.1	Gb(l)	0	3	90	7									
230.0	Gb(l)	0	1	51	48	24	54	22	60	93		15.5	115	19.1
230.1	Gb(l)	0	0	67	33									
235.0	Gb(l)	0	18	64	18	16	60	25	55	83	1.66	5.5	212	0
235.1	Gb(l)	0	53	38	9									
240.0	Gb(z)								57	70		3	188	
240.1	Gb(z)													
245.0	Gb(z)					17	64	19	63	75	2.3	3	178	
250.0	Gb(z)								61	83		−2		
255.0	Gb(z)								52	92		2		
260.0	Gb(z)													
265.0	Gb(z)													
270.0	Gb(z)								40	60				
276.0	Go	2	54	27	19	24	55	21	63	79	1.59	17.5	151	8.2
280.0	Go	3	57	24	19	23	56	21	75	85	1.79	17	132	7.4
285.0	Go								45	77	1.88	12		
290.0	Go	3	49	25	26	27	52	22	72	81	1.67	19	173	7.8
295.0	Go	4	47	31	22	23	52	25	70	71	1.4	18	184	8
300.0	Go	2	48	27	25	19	59	22	69	96	1.86	14		7.6
305.0	Go	8	44	30	26	24	56	20	63	84	1.94	16		8.8

Appendix B (cont.). Laboratory data; particle – size determinations done by hydrometer and wet sieving.

Boring NIPC – 1 (cont.)

Depth (ft)	UNIT	<2 mm fraction %				Clay mineral content of the < 2 μm fraction						Blow Moist.		
		GR	SD	ST	CL	EXP	ILL	K+C	CAL	DOL	DI	VI	Cnts	cont
310.0	Go	3	45	24	31	20	57	23	76	91	1.72	19		
315.0	Go	3	45	29	26	18	58	24	72	89	1.62	14		
320.0	Go	6	45	29	26	18	61	22	62	80	1.81	16	93	8.6
325.0	Go	4	43	30	27	19	60	21	63	90	1.91	10	83	9.6
330.0	Go	2	44	29	27	18	59	24	75	89	1.67	17	202	9.3
335.0	Go(z)					19	56	25	54	96	1.59	5	114	
340.0	Go(z)					24	55	21	26	77	1.78	12	102	
345.0	Go(z)	4	56	35	9	29	53	19	46	67	1.92	19.5	191	
350.0	Go(z)	2	26	52	22	38	43	20	27	30	1.45	31.5	132	
355.0	Go(z)												120	
360.0	Go(z)												184	
365.0	Go(z)	43	58	30	12				36	117				
370.0	Go(z)								41	136	2.28			
375.0	Go(z)								37	116	2.13		173	
380.0	Go(z)													
385.0	Go(z)								33	77	2.23		121	
390.0	Go(z)					27	53	20	22	33		17	88	
395.0	Go(z)	0	44	41	15	34	49	17	29	39	2	23	126	
400.0	Go(z)					32	51	17	31	50	2.07	25	100	
405.0	Go(z)								46	88	1.7		142	
405.1	Go(z)													
415.0	Go(z)								53	95	1.9		231	
415.1	Go(z)													
425.0	Go(z)													
425.1	Go(z)													
435.0	Go(z)								27	113	2.4		234	
441.0	Go(z)								28	107	2.5		185	
441.1	Go(z)													
447.0	Go(z)								26	92	1.9		238	
452.0	Go(z)								24	85	1.6	-9	237	
453.1	Go(z)													
460.0	Go(l)		5	83	12	16	62	22	21	55	2.04	-8	284	
460.1	Go(l)													
470.0	Go(l)	3	55	30	15	26	53	21	48	74	1.74	-15	216	7.9

Depth (ft)	UNIT	<2 mm fraction %				Clay mineral content of the < 2 μ m fraction							Blow Moist.	
		GR	SD	ST	CL	EXP	ILL	K+C	CAL	DOL	DI	VI	Cnts	cont
2.0 Wh		11	53	41	6	11	63	26		27	1.6	4.5	25	13.5
4.5 Wh		13	50	41	9	24	56	21	30	87	1.8	11	16	12.2
7.0 Wh		10	58	35	7	24	53	24	16	52	1.5	12.5	36	5.6
9.5 Wh		16	54	35	11	16	57	27	26	97	1.4	8	36	9.3
12.0 Wh		7	57	35	8	20	61	20	31	88	21	8	31	9.3
14.5 Wh		8	52	38	10								38	
17.0 Wh(z)		21	69	25	6	16	59	26	32	77	1.5	4	25	
19.5 Wh		13	57	31	12	19	57	24	33	65	1.6	2	25	
22.0 Wt		5	36	38	26	16	64	21	49	82	2	6	16	11.7
24.5 Wt		5	41	35	24	14	64	23	52	99	1.9	5.5	20	11
27.0 Wt		6	45	36	19	14	63	24	35	69	1.8	7	22	10.4
29.5 Wt		8	42	36	22	11	64	26	39	64	1.7	4.5	21	10.4
32.0 Wt		6	39	39	22	13	65	23	36	68	1.9	3.5	20	11.5
34.5 Wt		5	40	36	24	13	66	22	53	85	2.1	6	22	
37.0 Wt		4	38	37	25								37	
39.5 Wt		6	38	38	24	12	64	24	52	69	1.8	5.5	19	11
42.0 Wt		8	37	39	24	7	68	25	34	70	1.9	2.5	25	
44.5 Wt		7	39	40	21	7	70	23	49	80	2	1.5	23	10.2
47.0 Wt		3	37	36	27	10	66	25	52	86	1.8	4	24	
49.5 Wt		11	37	39	24	11	68	22	46	72	2.1	7	21	10.3
52.0 Wt						13	68	20	45	78	2.3	5.5	25	
54.5 Wt						10	65	26	25	58	1.6	3.5	19	
59.5 Wt		8	36	40	24	9	67	25	37	60	1.8	4	25	10.9
62.0 Wt		4	37	36	27	9	67	24	45	70	1.9	2.5	21	11.4
64.5 Wt		5	37	36	27	7	70	24	27	58	1.95	1	26	10.4
67.0 Wt													24	
69.5 Wt													55	
72.0 Wt		8	42	36	22	8	70	22	49	72	2	0	27	10.2
74.5 Wt		20	48	38	14	6	72	23	42	71	2.1	-3	17	
77.0 Wt		2	37	39	24	11	70	19	30	76	2.5	3.5	15	10.2
79.5 Wt													24	
82.0 Wt		4	33	41	26	9	66	25	37	64	1.75	5	16	8.3
84.5 Wt		6	38	40	22	8	68	25	44	80	1.8	3.5	17	11.7
87.0 Wt		6	37	37	26	9	67	24	35	97	1.9	3	18	10.8
89.5 Wt		5	36	40	24	9	69	23	39	86	2.1	0	19	10.4
92.0 Wt		11	35	38	27								17	11.2
94.5 Wt		8	37	36	27	6	73	22	47	66	2.3	3.5	18	10.9
97.0 Wt			</											

Appendix B (cont.). Laboratory data; particle – size determinations done by hydrometer and wet sieving.

Boring NIPC–2 (cont.)

Depth (ft)	UNIT	<2 mm fraction %				Clay mineral content of the < 2 μ m fraction							Blow	Moist.
		GR	SD	ST	CL	EXP	ILL	K+C	CAL	DOL	DI	VI	Cnts	cont
105.0 Wt		7	37	36	27	7	71	22	49	82	2.2	27	32	10.3
110.0 Wt						14	63	23	37	80	1.9	3		
115.0 Wt		6	28	46	26	10	68	22	36	80	2.1	0	29	
115.0 Wt						16	60	24	39	76	1.73	7		
125.0 Wt		11	31	45	24								5	
126.0 Wt						11	66	23	45	74	1.9	1		
135.0 Wt		11	37	36	27	12	65	24	43	82	1.78	6	23	9.4
140.0 Wt						9	71	21	42	80	2.25	1		
145.0 Wt		8	34	41	25	9	69	22	51	82	2.1	0	32	9.4
150.0 Wt		20	38	38	24	8	74	19	27	52	2.6	3		
155.0 Wt		4	37	40	23	7	71	22	32	91	2.17	3.5	178	
160.0 Wt		10	39	37	24	7	72	21	35	70	2.3	-0.5		
165.0 Wt		7	34	40	26	7	70	24	47	86	2	-1	36	10.7
170.0 Wt						10	67	23	45	82	1.96	0		
175.0 Wt		5	36	39	25	8	68	25	39	71	1.8	-2	19	11
180.0 Wt						9	72	20	49	92	2.3	0		
185.0 Wt		3	34	38	28	10	67	24	41	89	1.9	0.5	25	10.7
190.0 Wt						10	69	22	44	77	2.08	2		
195.0 Wt		3	36	39	25	8	70	22	53	93	2.1	2	28	
200.0 Wt						8	67	26	41	75	1.72	1		
205.0 Wt		5	34	41	25	7	70	23	60	81	2.1	-2.5	34	12.4
210.0 Wt						11	63	26	47	80	1.67	3.5		
215.0 Wt		3	35	38	26	9	67	25	53	98	1.8	-3	45	10.1
220.0 Wt						11	67	22	56	102	2	-0.5		
225.0 Wt		4	36	34	30	7	68	26	51	98	1.74	-1	39	10.2
230.0 Wt						11	67	23	53	94	2	0		
235.0 Wt		5	35	42	23	9	66	25	51	92	1.8	4	32	3.1
240.0 Wt		3	36	38	26	9	69	23	53	87	2	-1	62	10.4
245.0 Wt						10	66	25	54	85	1.8	1		
250.0 Wt		3	36	34	30	9	66	25	41	71	1.8	1	58	10.9
255.0 Wt						10	69	21	49	90	2.2	0.5		
260.0 Wt		5	36	35	29								35	
265.0 Wt						11	66	23	55	95	1.9	3		
270.0 Wt		5	35	42	23	10	69	22	51	74	2.1	3	65	10
275.0 Wt		3	35	42	23	8	64	29	42	63	-1.4	0.5	65	9.2
280.0 Wt						9	68	23	53	91	2	2		
285.0 Wt		3	35	39	26	8	68	24	49	89	1.9	4	56	10
290.0 Wt						12	67	22	46	95	2.1	2.5		
295.0 Wt		2	34	43	23	11	69	21	49	88	2.15	-1	69	9.1

Appendix B (cont.). Laboratory data; particle-size determinations done by hydrometer and wet sieving.

Boring NIPC-2 (cont.)

Depth		<2 mm fraction %				Clay mineral content of the < 2 μ m fraction							Blow Moist.	
(ft)	UNIT	GR	SD	ST	CL	EXP	ILL	K+C	CAL	DOL	DI	VI	Cnts	cont
300.0	Wt	3	33	44	23	11	69	21	53	87	2.2	0		9.8
305.0	Wt	4	32	38	30	9	69	23	50	89	2	0	69	
313.0	Wt	7	31	40	29	9	66	25	28	86	1.8	3	105	
318.0	Wa					9	71	20	37	93	2.35	1.5	59	
323.0	Wa	17	88	11	1	14	64	23	30	88	1.9	6	201	
329.0	Wa	11	72	21	7	14	63	23	51	80	1.85		159	

Boring NIPC-3

Depth		<2 mm fraction %				Clay mineral content of the < 2 μm fraction						Blow Moist.		
(ft)	UNIT	GR	SD	ST	CL	EXP	ILL	K+C	CAL	DOL	DI	VI	Cnts	cont
2.5	Wt(x)	7	43	36	21	26	58	16	17	92	2.5	27.5	12	12.3
4.5	Wt(x)					26	61	13	30	112	3	22.5	13	11.2
7.5	Wt	7	42	37	21	27	60	13	60	99	3	20	18	12.2
10.0	Wt	5	43	41	16	28	59	13	43	80	3.2	15	11	12.2
11.5	Wt	6	42	35	23	28	59	13	63	84	3.1	18	13	12.3
15.0	Wt	4	44	38	18	26	60	14	55	103	2.8	15	16	12
17.5	Wt	5	41	38	21	17	62	21	54	110	1.95	11	13	11.3
20.0	Wt	3	37	43	20	17	61	22	66	116	1.8	9.5	11	11.3
22.5	Wt					13	62	25	65	101	1.7	4.5	8	
25.0	Wt								35	94	2	2.5	31	
27.5	Wt(z)								42	92	1.5	5	61	
30.0	Wt(z)					19	60	21	72	121	2	14	51	
32.5	Wt	5	38	42	20	17	62	21	57	97	1.9	12	17	14.1
35.0	Wt	3	41	36	23	17	62	21	65	100	2	13	22	11.3
37.5	Wt	12	40	43	17	16	62	22	66	106	1.8	11	26	10.9
40.0	Wt	4	41	41	18	18	61	21	66	105	2	12.5	22	12.1
42.5	Wt	6	42	40	18	16	64	20	62	111	2.1	8	18	10.9
45.0	Wt	6	41	42	17	15	63	22	62	110	2	8.5	18	10.7
47.5	Wt	5	41	44	15	15	63	22	67	118	1.8	10.5	22	10.7
50.0	Wt	5	39	39	22	14	66	20	62	130	2.16	9	23	10.6
52.5	Wt	4	39	38	23	16	64	20	52	94	2.16	10	35	10.9
55.0	Wt	7	41	35	24	15	67	18	54	88	2.4	6	34	10.7
57.5	Wt	7	40	45	15	14	66	20	54	93	2.17	6	39	
60.0	Wt	3	43	42	15	15	66	19	61	95	2.2	6.5	40	10.1
62.5	Wt	5	44	45	11	14	62	24	64	93	1.76	9.5	43	9
65.0	Wt	5	45	37	18	13	66	21	60	95	2.1	8	38	9.7

Appendix B (cont.). Laboratory data; particle-size determinations done by hydrometer and wet sieving.

Boring NIPC-3 (cont.)

Depth		<2 mm fraction %				Clay mineral content of the < 2 μ m fraction						Blow Moist.		
(ft)	UNIT	GR	SD	ST	CL	EXP	ILL	K+C	CAL	DOL	DI	VI	Cnts	cont
67.5	Wt	8	44	43	13	11	66	23	71	104	1.9	7.5	38	12
70.0	Wt	3	40	38	22	13	67	20	51	108	2.2	6	100	7.6
72.5	Wt	4	44	39	17	11	67	22	54	98	2.05	6	28	
75.0	Wt	4	40	42	18	12	67	21	57	105	2.2	7	24	10.6
77.5	Wt	6	40	42	18	15	65	20	58	99	2.15	7	22	8.9
80.0	Wt	4	42	41	17	14	68	18	64	93	2.4	9.5	18	10.7
82.5	Wt	4	40	41	19	12	67	21	56	95	2.1	6	25	10.2
85.0	Wt	4	39	42	19	13	67	20	53	109	2.26	7	18	10.8
87.5	Wt	4	39	41	20	12	66	22	52	83	2	5	26	9.9
90.0	Wt	6	34	46	20	14	66	20	47	117	2.14	5	25	10.2
92.5	Wt	4	37	37	26	9	72	19	64	104	2.49	2	31	10.7
95.0	Wt	5	34	42	24	10	70	20	65	114	2.33	2	25	11
97.5	Wt					10	71	19	69	106	2.55	2		11.2
100.0	Wt	7	32	42	26	12	69	19	66	111	2.36	2.5	27	10.6
110.0	R					38	50	12	9	25	2.7	34		
115.0	Pe								56	92	1.67			
120.0	Pe	48	71	18	11				44	98	2.14			
125.0	Pe	2	33	46	21	14	67	19	35	102	2.35	0		
130.0	Pe								39	64	1.54			
135.0	Go	8	41	32	27	27	54	19	61	57	1.83	20		
140.0	Go	9	50	31	19	18	64	18	65	90	2.4	9		
145.0	Go(z)								53	78	2.05			
150.0	Go(l)	1	2	53	45	26	56	18	85	92	2	16.5		
155.0	Gos	43	27	39	34	25	57	18	75	81	2.06	13.5		
160.0	Gos	5	30	34	36	20	61	19	80	92	2.05	9.5		10
165.0	Gos	8	29	33	38	20	61	19	78	94	2.07	11.5		11
170.0	Gos	9	31	37	32	5	66	29	81	79	1.53	3		
175.0	Gf	20	44	41	15	10	74	16	44	94	3	-7		
180.0	Gf	12	32	51	17	8	77	15	47	134	3.35	-9.5		
185.0	Gf	13	43	38	19	10	73	17	48	96	2.86	-10		
190.0	Gf	40	30	38	32	11	71	18	62	114	2.58	-2		

Appendix B (cont.). Laboratory data; particle-size determinations done by hydrometer and wet sieving.

Boring NIPC-4

Depth (ft)	UNIT	<2 mm fraction %				Clay mineral content of the < 2 μ m fraction							Blow Moist.	
		GR	SD	ST	CL	EXP	ILL	K+C	CAL	DOL	DI	VI	Cnts	cont
4.5 H									10	82	3.85	-4	80	
9.5 H									17	90	4	-6.5	75	
14.5 H									17	66	3.78	-8	33	
19.5 H		8	84	12	4				18	73	2.42	-6	68	
24.5 H									19	69	3.31	-5	40	
29.5 H									16	46	3.6	1	46	
34.5 Wt		11	45	38	17	13	65	23	37	70	1.9	4	8	
39.5 Wt						13	65	23	37	70	1.9	4		
44.5 Wt		10	37	40	22	14	63	23	49	79	1.8	7.5	15	9.1
44.5 Wt		12	38	33	29	8	69	23	42	73	2.11	0		
49.5 Wt		4	35	38	28	14	65	22	50	67	2	7	19	10.8
49.5 Wt		7	36	35	29	8	70	22	50	81	2.11	5.5		
54.5 Wt(z)		9	33	39	28	14	63	23	53	89	1.85	8	82	8.2
54.5 Wt(z)		53	75	15	10	8	70	22	57	84	2.06	5		
59.5 Wt		7	32	35	34	13	67	21	36	71	2.2	3	40	10.6
59.5 Wt		3	29	43	28	10	68	22	43	71	10	4.5		
64.5 Wt		4	33	35	32	14	65	22	44	63		7	38	11.1
64.5 Wt		2	35	35	30	9	69	22	43	75	2.06	2		
69.5 Wt													42	
74.5 Wt						16	63	22	45	75	1.95	10	28	
79.5 Wt		10	40	28	32	9	70	21	41	64	2.89	3.5	28	10.6
84.5 Wt		5	33	36	31	14	64	23	46	73	1.8	6.5	30	10.4
84.5 Wt		4	32	39	29	7	71	22	43	70	2.11	-2.5		
89.5 Wt		4	33	35	32	6	73	21	50	82	2	3	24	12.6
89.5 Wt		8	35	30	35									
94.5 Wt(z)		5	60	25	15	9	68	24	36	75	1.9	2.5	64	
94.5 Wt(z)		5	62	28	10	6	70	24	50	98	1.93	2.5		
99.5 Wt		5	35	35	30	12	67	22	39	77	2	2	30	
105.0 Wt		4	31	35	34	6	72	22	45	80	2.14	2.5	32	11.9
105.0 Wt		7	34	36	30									
110.0 Wt		10	32	38	31	10	65	25	45	75	1.7	8	54	9.1
110.0 Wt		9	35	35	30	13	65	22	59	82	2.27	4		
115.0 Wt		9	35	37	28	5	69	26	56	95	1.77	2.5		11.9
120.0 Wt		8	32	35	33	10	67	23	81	73	1.96	4	37	12.5
120.0 Wt		4	36	36	28	9	71	20	55	81	2.31	1		
125.0 Wt		7	30	40	30	8	69	23	49	82	2.05	1.5	83	9.8
130.0 Wt														
135.0 Wt		5	31	37	33	5	71	24	48	71	5	-5	82	18.3
135.0 Wt		3	35	35	30	5	74	21	49	79	2.3	-7.5		

Appendix B (cont.). Laboratory data; particle-size determinations done by hydrometer and wet sieving.

Boring NIPC-4 (cont.)

Depth (ft)	UNIT	<2 mm fraction %				Clay mineral content of the < 2 μ m fraction							Blow Moist.	
		GR	SD	ST	CL	EXP	ILL	K+C	CAL	DOL	DI	VI	Cnts	cont
140.0 Wt		8	30	38	32	4	74	22	59	99	2.22	-7.5	75	9.9
140.0 Wt		7	34	37	29									
145.0 Wt		8	31	36	34	6	72	22	47	77	2.2	-2.5	31	10.5
145.0 Wt		4	34	37	29	5	73	22	58	88	2.22	-5.5		
150.0 Wt		8	32	37	31	6	72	22	43	88	2.15	-6	37	
150.0 Wt		9	36	34	30									
155.0 Wt		8	28	38	34	7	72	22	49	84	2.3	-3	72	3
155.0 Wt		4	32	40	28	5	72	23	61	91	2.12	-3.5		
160.0 Wt		3	29	38	33	4	72	24	56	86	2.03	-3	34	
160.0 Wt		4	32	39	29									
165.0 Wt		5	28	37	35	6	72	23	50	84	2.1	-3	44	
165.0 Wt		4	30	40	30	4	72	24	66	105	1.96	-5		
170.0 Wt		20	24	41	35	4	72	24	59	112	1.95	-7	38	
170.0 Wt		4	32	36	32									
175.0 Wt		5	25	40	35	6	72	22	54	88	2.15	-0.5	37	
175.0 Wt		3	27	40	33	6	68	26	63	110	1.74	0		
180.0 Wt		13	23	40	37	8	73	19	51	85	2.61	-2	34	
180.0 Wt		12	29	41	30									
185.0 Wt		2	24	41	35	8	71	22	53	86	2.18	0	37	
185.0 Wt		3	26	42	32	7	72	21	50	107	2.26	-5.5		
190.0 Wt		4	21	42	37	7	72	21	60	95	2.33	-6.5	42	
190.0 Wt		4	25	42	33									
195.0 Wt		4	25	40	35	6	72	22	44	89	2.15	-1.5	39	
195.0 Wt		6	28	41	31	6	73	21	55	83	6	-2		
200.0 Wt		4	25	41	34	7	73	20	61	96	2.34	-3	41	
200.0 Wt		2	29	41	30									
206.0 Wt(z)		2	66	24	10				35	87	2.14	-2.5	89	
210.0 Wt						8	68	24	52	96	1.83	-1		

Appendix B (cont.). Laboratory data; particle-size determinations done by hydrometer and wet sieving.

Boring NIPC-5

Depth		<2 mm fraction %				Clay mineral content of the < 2 μm fraction						Blow	Moist.	
(ft)	UNIT	GR	SD	ST	CL	EXP	ILL	K+C	CAL	DOL	DI	VI	Cnts	cont
4.5	Wy(x)					21	67	12	25	67	3.6		5	
9.5	Wy(x)					35	55	10	23	50	3.7		29	
14.5	Wy	4	48	45	7	13	68	19	21	50	2.3	2	24	
19.5	Wy	11	50	38	12	14	62	24	33	71	1.7	6.5	12	
24.5	Wy(z)												18	
29.5	Wy(z)												12	
34.5	Wt	12	34	41	25	16	62	22	54	90	1.8	10	19	10.9
39.5	Wt	7	36	39	25	14	62	24	57	97	1.75	10	16	11.5
44.5	Wt	6	36	39	25	15	64	21	62	94	2	11	16	10.8
49.5	Wt	6	51	33	16								12	14.6
54.5	Wt	7	35	40	25	15	62	23	60	95	1.8	8	14	13.5
59.5	Wt	4	35	37	28	14	63	23	69	97	1.8	8	25	
64.5	Wt	4	36	37	27	14	64	22	54	102	1.95	6	20	12
69.5	Wt	4	34	33	33	17	60	23	53	91	1.8	14	30	11.3
74.5	Wt	3	36	35	29	16	60	24	35	68	1.7	11	42	10
79.5	Wt(z)	40	62	23	15	15	62	23	51	81	1.8	8.5	31	
84.5	Wt	6	41	34	25	15	64	21	59	94	2	10	25	10.9
89.5	Wt	7	36	35	29	17	62	21	64	95	1.9	12.5	22	11.5
94.5	Wt	8	35	38	27	18	60	22	65	106	1.8	14	30	11
99.5	Wt	3	36	35	29	18	59	23	67	92	1.7	15	25	11.4
105.0	Wt					17	57	26	54	100	1.55	9.5		
110.0	Wt	5	35	35	30	11	69	20	71	107	2.3	1	61	9.3
115.0	Wt	4	36	35	29	16	61	23	57	94	1.8	13.5	70	11
120.0	Wt	8	35	39	26	14	64	22	59	88	1.9	9.5		11.7
125.0	Wt					17	61	22	56	101	1.8	10.5	35	
130.0	Wt	3	33	38	29	15	63	22	52	106	1.9	11	31	11.4
135.0	Wt	6	34	38	28	15	63	22	67	96	1.9	9	32	10.7
140.0	Wt	12	34	39	27	15	64	21	71	86	1.95	9	34	14.4
145.0	Wt	3	34	37	29	15	64	21	54	96	2.06	9.5	32	11.3
150.0	Wt	3	38	37	25	11	67	22	70	100	2.04	4	98	8.5
155.0	Wt	2	36	37	27	15	64	21	58	94	2	11	34	10.5
161.0	Wt	3	30	43	27	9	68	23	62	98	2	0.5	40	10.8
166.0	R								8	13	1.5	9	75	
170.0	R					85	10	6			1.1		70	
175.0	R					25	62	13	15	195		8		
180.0	T	0	21	45	34	13	70	17	67	188	2.86	0	34	
184.0	T		2	63	35	35	53	12	43	146	2.8	13.5	42	

Appendix B (cont.). Laboratory data; particle – size determinations done by hydrometer and wet sieving.

Boring NIPC–6

Depth		<2 mm fraction %				Clay mineral content of the < 2 μ m fraction						Blow Moist.		
(ft)	UNIT	GR	SD	ST	CL	EXP	ILL	K+C	CAL	DOL	DI	VI	Cnts	cont
4.5 H													9	
9.5 H													18	
14.5 H													12	
19.5 H													7	
24.5 H													19	
29.5 H													12	
34.5 H													15	
39.5 H									17	66	2.29	-4		
44.5 H									35	112		0	8	
49.5 H													75	
54.5 H													20	
59.5 H									65	139	1.5	9		
64.5 H									32	107	2.1	0		
69.5 H													40	
74.5 H													39	
74.5 Wt		4	33	37	30	24	56	21	61	80	1.7	5.5	39	12
79.5 Wt		9	27	36	37	19	62	20	75	90	2	6.5	60	11.6
85.0 Wt													174	
90.0 Wt(z)		11	80	14	6	14	65	22	28	73	2	-2.5	89	
95.0 Wt		6	37	35	28	15	68	18	64	95	2.5	-1	67	
100.0 Wa		1	90	9	1	20	63	18	39	78	2.4	7.5	55	
105.0 Wa			8	55	37	19	66	16	55	80	2.7	21.5	48	
111.0 Wa		9	46	40	14	21	59	20	51	95	1.9	7.5	88	
115.0 G		12	63	22	15	21	57	23	68	94	1.7	7	53	
120.0 G		8	42	34	24	18	63	20	80	107	2.1	5.5	72	7.2

Appendix B (cont.). Laboratory data; particle-size determinations done by hydrometer and wet sieving.

Boring NIPC-7

Depth		<2 mm fraction %				Clay mineral content of the < 2 μm fraction						Blow	Moist.	
(ft)	UNIT	GR	SD	ST	CL	EXP	ILL	K+C	CAL	DOL	DI	VI	Cnts	cont
2.0	Wh	13	40	39	21	25	61	14	0	0	2.8		17	16.2
4.5	Wh												25	
7.0	Wh	5	43	37	20	19	72	9	38	86	4.9		26	11
9.5	Wh	8	42	42	16	16	72	12	40	64	4		26	9.7
12.0	Wh	7	41	39	20	12	77	11	32	71	4.4		32	9.2
14.5	Wh	7	41	39	20	15	75	10	30	79	4.5		42	8.7
17.0	Wh	5	42	41	17	18	70	12	40	75	3.8		54	9.7
19.5	Wh	8	41	40	19	15	72	13	62	80	3.6		61	9.5
22.0	Wh					26	56	18	62	83	2		70	
24.5	Wh(z)												22	
27.0	Wh(z)												25	
29.5	Wh(z)												26	
32.0	Wh(z)												25	
34.5	Wh(z)												56	
39.5	Wh(z)												27	
44.5	Wh(z)												27	
49.5	Wh(z)												22	
54.5	Wh(z)												28	
59.5	Wh(z)												60	
64.5	Wh(z)												29	
69.5	Wh(z)												28	
74.5	Wt(z)												52	
79.5	Wt(z)												21	
89.5	Wt(z)												60	
94.5	Wt(z)												15	
97.0	Wt	9	61	20	19	13	64	23	54	100	1.8		15	
99.5	Wt(z)												65	
105.0	Wt(z)												53	
115.0	Wt(z)												117	
120.0	Wt(z)												106	
125.0	Wt	4	36	36	28	13	64	23	67	88	1.7		128	
130.0	Wt	6	49	35	16	26	53	21	71	92	1.7		48	
135.0	Wt	4	42	47	11	27	55	18	62	89	2		45	
140.0	Wt	6	57	29	14	28	50	22	77	85	1.5		37	
145.0	Wa												70	
150.0	Wa					20	56	24	91	102	1.6		50	
155.0	Go	12	57	28	15	18	60	22	102	154	1.8		83	
160.0	Go	5	54	30	16	14	63	23	87	152	1.8		83	
165.0	Go	50	69	31	0	10	71	19	46	115	2.5		137	

Appendix B (cont.). Laboratory data; particle-size determinations done by hydrometer and wet sieving.

Boring NIPC-8

Depth (ft)	UNIT	<2 mm fraction %				Clay mineral content of the < 2 μ m fraction							Blow	Moist.
		GR	SD	ST	CL	EXP	ILL	K+C	CAL	DOL	DI	VI	Cnts	cont
4.5 C						84	11	6		6	1.3		3	72
9.5 C						83	12	6	12	45	1.5		31	
14.5 H						47	39	15		61	1.8		30	
19.5 H													12	
21.0 Wt		7	49	34	17	18	60	23	45	89	1.7	14	8	11.2
24.5 Wt		14	50	38	12	18	59	24	35	65	1.7	10	8	10.1
29.5 R			41	54	5	12	65	24	25	58	1.8	5	30	
32.0 R						16	59	25	24	57	1.55	11.5	23	
34.5 R						15	59	27	21	31	1.5	13	18	
39.5 R			44	30	26	87	7	6			0.79		8	17.3
44.5 Go													7	
49.5 Go						15	66	19	9	72	2.31	4.5	30	
54.5 Go		6	39	43	18	17	64	20	52	71	2.16	2	32	10.4
59.5 Go		3	30	45	25	21	60	19	72	77	2.15	6	43	11.2
64.5 Go		5	42	38	20	23	58	20	72	86	1.96	9	37	10.1
69.5 Go		6	43	35	22	22	59	19	72	92	2.07	4	29	10.1
74.5 Go		8	61	29	10	31	53	17	60	73	1.94	10	33	9.9
79.5 Go		8	47	34	19	28	51	22	63	77	1.55	13	37	10.2
84.5 Gos		5	38	36	26	24	56	20	85	100	1.9	8	35	11.1
89.5 Gos													57	
94.5 Gos		4	36	34	30	18	61	22	77	81	1.9	7	46	11.9
99.5 Gos		4	30	35	35	17	59	25	76	70	1.6	8	40	12.8
105.0 Gos		3	23	35	42	15	60	26	70	91	1.6	3		
110.0 Gos		2	23	37	40	16	56	29	86	115	1.3	5	47	
115.0 Gos(z)														
120.0 Gf		10	43	43	14	12	68	21	50	92	2.2	-4	124	
125.0 Gf													127	
130.0 Gf		45	48	34	18	13	70	18	52	165	2.55	-2	148	

[illegible]

Appendix B (cont.). Laboratory data; particle-size determinations done by hydrometer and wet sieving.

Boring NIPC-10

Depth (ft)	UNIT	<2 mm fraction %				Clay mineral content of the < 2 μ m fraction							Blow	Moist.
		GR	SD	ST	CL	EXP	ILL	K+C	CAL	DOL	DI	VI	Cnts	cont
4.5 C		31	83	13	4	38	46	16	16	60	1.8	18	25	
9.5 H						16	63	21	43	62	2	7	78	
14.5 H									19	55			16	
19.5 H									28	59		0	25	
24.5 H													10	
29.5 H													16	
34.5 H													30	
39.5 Go		8	36	41	23	19	60	21	72	96	1.95	11	15	12.3
44.5 Go		2	20	35	45	21	57	22	59	64	1.66	10	16	
49.5 Go		3	21	35	44	19	60	21	71	83	1.91	10.5	30	15
54.5 Go		3	42	34	24	23	56	21	93	85	1.74	10.5	22	16.9
59.5 Go		3	23	33	44	20	56	24	81	91	1.57	12.5	10	16.8
64.5 Go(z)						20	58	22	59	62	1.75	10.5	70	
69.5 Gf		7	46	38	16	11	70	19	50	88	2.44	-1	30	9.8
74.5 Gf		16	49	37	14	11	69	20	52	98	2.34	1	200	

Appendix B (cont.). Laboratory data; particle-size determinations done by hydrometer and wet sieving.

Boring NIPC-11

Depth (ft)	UNIT	<2 mm fraction %				Clay mineral content of the < 2 μm fraction							Blow	Moist.
		GR	SD	ST	CL	EXP	ILL	K+C	CAL	DOL	DI	VI	Cnts	cont
4.5 H		11.4	97.1										15	
9.5 H		0.2	92.0										17	
14.5 H		24.5	98.6										17	
19.5 H		42.7	95.8										16	
24.5 H		85.6	97.9										16	
29.5 H		5.9	91.9										21	
34.5 H		23.4	90.6										20	
39.5 H													43	
44.5 H		3.7	100.0										22	
49.5 H		14.8	99.2										18	
54.5 H		15.4	99.6										19	
59.5 H		66	98.7										23	
64.5 H		70	96.2										61	
69.5 H		70.5	98.7										52	
74.5 H													55	
79.5 H		4.7	99.5										35	
84.5 H		17.8	91.4										38	
90.0 H		4.2	91.1										98	
95.0 H		1.3	97.0										104	
100.0 H		43.5	91.6										72	
105.0 H		34.1	93.7											
110.0 H		57.1	92.0										112	
115.0 H		27.8	98.4											
120.0 H		83.2	99.4											
125.0 H													171	
130.0 H		73.4	99.0										158	
135.0 H		42.5	97.7										159	
140.0 H		68.6	98.9											
145.0 H													200	

*GR = > #9 sieve (> 2.2 mm)

*SD = < #9 sieve (2.2 mm) and > #170 sieve (0.0088 mm)

